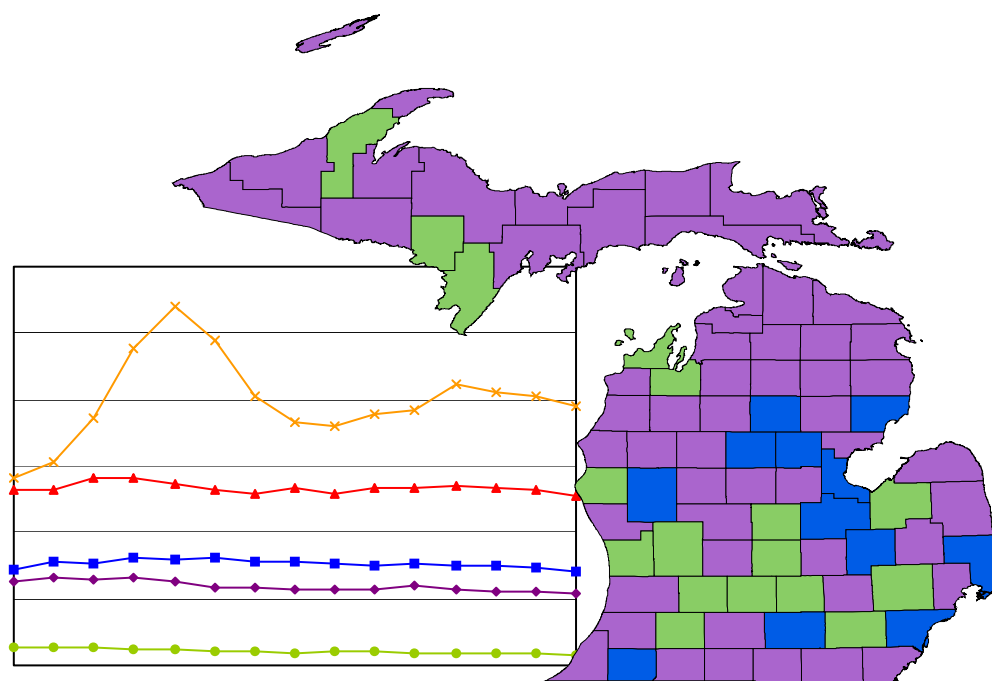


# The Cancer Burden in Michigan: Selected Statistics

(Date of Report: December 2005)



Developed by the Michigan Public Health Institute (MPHI) in support of the Michigan Cancer Consortium Initiative (MCCI).



Michigan Public  
Health Institute



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## Background

This report describes the cancer burden in Michigan in terms of morbidity and mortality, and the human and financial costs associated with cancer to the extent to which data are available at this time. Five cancer sites are presented: breast, cervical, colorectal, lung and prostate. Throughout this report, breast cancer statistics refer to female breast cancer only.

Presented in this report are epidemiological analyses of cancer mortality from years 1989 to 2003 and incidence from 1988 to 2002 for the selected cancer sites.<sup>1</sup> Mortality data are from the Michigan Resident Death Files and incidence data are from the Michigan Resident Cancer Incidence File, which are both provided by the Michigan Department of Community Health, Division of Vital Records and Health Statistics.<sup>2</sup> Michigan rates are compared with national mortality and incidence rates from the SEER Cancer Statistics Review, which is produced by the National Cancer Institute.<sup>3</sup> Unless otherwise specified, all incidence and mortality rates referred to in the text are age-adjusted according to the 2000 standard U.S. population.<sup>4</sup>

Also presented are data on the stage at diagnosis for cases reported in Michigan and relative survival rates for the selected cancer sites. Relative survival rates were obtained from the SEER Cancer Statistics Review.

Comparisons of incidence and mortality rates amongst Michigan counties and changes in the percentage of cases diagnosed at an early stage in counties are presented graphically on maps of Michigan.

A summary of data on cancer-related behavioral risk factors is also presented. Behavior data for Michigan residents were obtained from the Michigan Department of Community Health's Behavioral Risk Factor Survey System (BRFSS), the Michigan State Board of Education's Michigan Youth Risk Behavior Survey (YRBS), and the Special Cancer Behavioral Risk Factor Survey (SCBRFS), from the Michigan Department of Community Health and the Michigan Public Health Institute.<sup>5</sup>

<sup>1</sup> Whenever possible, the data quoted in this report are the most recent available. Frequently, there is an 18- to 24-month interval between the time a cancer is diagnosed and the time that information is available from the Michigan Cancer Registry. However, cancer mortality data for any given year generally are available from the Registry within several months after the close of that calendar year. Hence, the cancer-related mortality data that are available often are more recent than the available cancer-related incidence data.

<sup>2</sup> Michigan Resident Cancer Incidence File including cases processed by November 16, 2004 and Michigan Resident Death Files, Michigan Department of Community Health (MDCH), Division for Vital Records and Health Statistics.

<sup>3</sup> Ries LAG, Eisner MP, Kosary CL, Hankey BF, Miller BA, Clegg L, Mariotto A, Feuer EJ, Edwards BK (eds). *SEER Cancer Statistics Review, 1975-2002*, National Cancer Institute. Bethesda, MD, [http://seer.cancer.gov/csr/1975\\_2002/](http://seer.cancer.gov/csr/1975_2002/), based on November 2004 SEER data submission, posted to the SEER web site 2005. A continuing program of the National Cancer Institute (NCI), the SEER program collects data on a routine basis from designated population-based cancer registries in various areas of the country. Trends in cancer incidence, mortality and patient survival in the United States are derived from this database. SEER data are collected from nine or twelve geographic areas that represent, respectively, an estimated 9 or 14% of the US population. The long-term incidence trends and survival data for this report are from five states--Connecticut, Hawaii, Iowa, New Mexico, and Utah--and four metropolitan areas-- Detroit, Atlanta, San Francisco-Oakland, and Seattle-Puget Sound. Additional tables provide more recent incidence rates and trends for SEER from twelve areas (the nine areas above plus Los Angeles, San Jose-Monterey, and the Alaska Native Registry) since 1992. In 2002 Kentucky, Greater California (all remaining uncovered counties), Louisiana and New Jersey all became SEER participants.

<sup>4</sup> Michigan Department of Community Health (MDCH), Division for Vital Records and Health Statistics.

<sup>5</sup> Behavioral Risk Factor Surveillance System (1990-2004), Michigan Department of Community Health; 2003 Michigan Youth Risk Behavior Survey, Michigan State Board of Education; 2004 Special Cancer Behavioral Risk Factor Survey, Michigan Department of Community Health and Michigan Public Health Institute.

Analyses of years of life lost due to the selected cancers are presented for Michigan and the United States. Data for the United States were taken from the SEER Cancer Statistics Review, and United States 2002 Life Tables were used to calculate years of life lost in Michigan as well as nationally.<sup>6</sup>

Analyses of some of the financial costs of cancer are presented. Payment data are from Blue Cross Blue Shield of Michigan, Medicare Part A and Medicare Part B.<sup>7</sup> Hospitalization data are from the statewide hospital discharge database at the Michigan Department of Community Health and from Blue Cross Blue Shield of Michigan.<sup>8</sup>

A graphic presentation of the distribution of mammography and radiation therapy facilities in Michigan is presented. Mammography and radiation therapy facility data were obtained from the Michigan Department of Consumer Industry Services, Radiation Safety Section.<sup>9</sup> ArcView GIS software was used to analyze the proportion of the population within specified distances of mammography and radiation therapy facilities in Michigan.

The appendices include charts of incidence and mortality rates by county for the cancer sites.

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<sup>6</sup> United States Life Tables, 2002; National Vital Statistics Reports from the Centers for Disease Control and Prevention

<sup>7</sup> Blue Cross Blue Shield of Michigan, Center for Healthcare Quality; Blue Care Network; Medicare Part A and Medicare Part B from Michigan Peer Review Organization and Wisconsin Physician Service, Medicare Central Data Unit.

<sup>8</sup> Michigan Resident Hospitalizations Files, Michigan Department of Community Health (MDCH), Division for Vital Records and Health Statistics.

<sup>9</sup> Michigan Department of Consumer Industry Services, Radiation Safety Section ; “Mammography Facility Status in Michigan” and “Therapy Accelerator Facilities in Michigan”, May 9, 2005.

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## Selected Cancer Sites: All, Breast, Cervical, Colorectal, Lung, and Prostate

This section of the report presents the findings of epidemiological analyses of cancer mortality and incidence for the five selected cancer sites: breast, cervical, colorectal, lung, and prostate. Population data on deaths due to cancer from 1993 to 2003 and new cancer cases from 1990 to 2002 were made available from the statewide cancer registry at the Michigan Department of Community Health.<sup>1</sup> The numbers of estimated deaths due to cancer and estimated new cancer cases for 2005 were available from the American Cancer Society.<sup>2</sup>

### Michigan Mortality and Incidence

Age-adjusted mortality rates in 2003 and age-adjusted incidence rates in 2002 are presented for the selected cancers. These were calculated by the direct age-adjustment method, using the 2000 U.S. population age distribution as the standard population, to allow comparisons across population subgroups.<sup>3</sup>

Comparisons of age-adjusted mortality and incidence rates between gender and racial groups are presented, as are age-specific rates. Michigan mortality and incidence rates for the selected cancer sites are compared to the corresponding national rates. National data were obtained from the National Cancer Institute's SEER program.<sup>4</sup>

The proportions of cases diagnosed at different stages are compared between gender and racial groups to highlight disparities where they exist.

Michigan-specific data on rates of survival from the selected cancers are not available at this time. National data from the National Cancer Institute's SEER program on relative survival rates are presented. The relative survival rate represents the likelihood that a patient will survive their cancer for some specified time (usually five years) after their initial cancer diagnosis.<sup>5</sup>

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<sup>1</sup> Michigan Resident Cancer Incidence File including cases processed by November 16, 2004, and Michigan Resident Death Files, Michigan Department of Community Health (MDCH), Division for Vital Records and Health Statistics.

<sup>2</sup> Cancer Facts and Figures 2005, American Cancer Society. Available at: <http://www.cancer.org/downloads/STT/CAFF2005f4PWSecured.pdf>.

<sup>3</sup> Michigan Department of Community Health (MDCH), Division for Vital Records and Health Statistics.

<sup>4</sup> Ries LAG, Eisner MP, Kosary CL, Hankey BF, Miller BA, Clegg L, Mariotto A, Feuer EJ, Edwards BK (eds). *SEER Cancer Statistics Review, 1975-2002*, National Cancer Institute. Bethesda, MD, [http://seer.cancer.gov/csr/1975\\_2002/](http://seer.cancer.gov/csr/1975_2002/), based on November 2004 SEER data submission, posted to the SEER web site 2005. A continuing program of the National Cancer Institute (NCI), the SEER program collects data on a routine basis from designated population-based cancer registries in various areas of the country. Trends in cancer incidence, mortality and patient survival in the United States are derived from this database. SEER data are collected from nine or twelve geographic areas that represent, respectively, an estimated 9 or 14% of the US population. The long-term incidence trends and survival data for this report are from five states-- Connecticut, Hawaii, Iowa, New Mexico, and Utah--and four metropolitan areas-- Detroit, Atlanta, San Francisco-Oakland, and Seattle-Puget Sound. Additional tables provide more recent incidence rates and trends for SEER from twelve areas (the nine areas above plus Los Angeles, San Jose-Monterey, and the Alaska Native Registry) since 1992. In 2002 Kentucky, Greater California (all remaining uncovered counties), Louisiana and New Jersey all became SEER participants.

<sup>5</sup> Relative survival rates for cases diagnosed 1995-2000.

### County Mortality and Incidence

Ten-year age-adjusted incidence and mortality rates are presented for the selected cancers for each county. Rates were calculated by the direct age-adjustment method using the 2000 US population age distribution, and annual state population estimates based on actual size of the county populations for years 1993 to 2002 and 1994 to 2003 were used in calculating ten-year incidence and mortality rates, respectively. Z tests were used to compare rates among counties, identifying counties with significantly higher or lower rates than the all-county rate. In conducting the Z tests, the age-adjusted rate for all counties combined was calculated including only deaths in the state for which the county was known. Differences in age-adjusted incidence and mortality rates were tested at 95% confidence levels.

### Stage at Diagnosis, by Site and by County

The percentages of cancer cases diagnosed at the localized stage (Breast, Colorectal, and Prostate Cancer) and at the in-situ stage (Cervical Cancer) are presented for each county for the time periods from 1990 to 1992 and 2000 to 2002 to highlight where changes in the percentages of cases diagnosed at a localized or in-situ stage have occurred. The percentage of cases localized at diagnosis is calculated out of all invasive cancers of the specific sites; the percentage of cases in-situ at diagnosis is calculated out of all invasive and in-situ cancers of the specific sites. To illustrate changes in stage at diagnosis, counties were ranked according to the percentage of cases that were diagnosed while the cancer was still localized and/or in-situ in the first three-year period. Counties were divided into quartiles for these ranked percentages. The same percentage ranges were used to classify counties during the second three-year period so that changes could be observed visually by comparing maps for each period.

Conclusions from this analysis by county must take into consideration the various factors contributing to changes in stage at diagnosis at the county level. One factor to consider is the limitation of the low number of cases in some counties. Several counties had fewer than 20 reported cancer cases for at least one of the time periods and cancer sites. Therefore, a decrease in the percentage of cases localized at diagnosis could mean a relatively small change in the number of cases at each stage. Also, it is important to note that changes in reporting and staging practices could have changed over time within a county. Usually increases in the percentage of cases localized or in-situ at diagnosis are associated with an increase in screening but an apparent decline in the percentage localized or in-situ does not necessarily reflect changes in prevention practices or quality of care. Yet, as an illustration of changing trends in stage at diagnosis, comparing the maps for each time period reveals where broad changes have occurred in the state as a whole.

At the time of these analyses the stage of diagnosis data for 2001 was not available for Kent County and, therefore, Kent County was excluded from all map illustrations documenting stage at diagnosis by county.

### Average Mammography Workload, by County

Mammography workload data were obtained from the Michigan Department of Community

Health's Radiation Safety Section.<sup>6</sup> Monthly patient workloads are provided by mammography facility staff that assist during annual inspections of mammography machines. The data received can accurately reflect the mammography facility's true patient workload, but other times will only represent the facility person's best estimate of the total mammography patient workload. This analysis was based on the inspections of 4,129 machines with only 57 of these machines having no workload data recorded. For different reasons, one mammography machine may get inspected more than once in a calendar year, but the data used in this analysis only considers one inspection per machine when determining total mammography workload.

The average number of mammograms per 1000 women over the age of 40 was calculated by county for two time periods, 1996-1999 and 2000-2003, using the 1998 and 2002 Michigan female aged 40 and older populations, respectively. The percent change in mammography workload for each county was then calculated by using the average number of mammograms for the two time periods. It is important to note that the number of mammography machines per county may vary from year to year, and the percent change calculated for each county is not adjusted for any fluctuation in the number of mammography machines operating within each county. A follow-up survey has been planned to gather more detailed information on mammography facilities throughout the state of Michigan.

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<sup>6</sup> Michigan Department of Community Health, Radiation Safety Section obtained November 2004.

## Summary

Analyses of deaths due to cancer and new cancer cases at all sites combined are shown in Tables 1 and 2. Most cancer cases and deaths occur in the population aged 55 years and older.

Following the tables showing statistics for all cancer sites combined are tables showing statistics for five sites: breast cancer (Tables 3 through 11), cervical cancer (Tables 12 through 19), colorectal cancer (Tables 20 through 27), lung cancer (Tables 28 through 35), and prostate cancer (Tables 36 through 43).

Cancer mortality and incidence rates are higher in the older age groups for breast, colorectal, lung and prostate cancer. Cervical cancer mortality rates also increase with age, however cervical cancer incidence rates among women age 40 years and older stabilize and then decrease.

Mortality rates for each of the sites are higher among blacks than among whites. Although breast cancer incidence rates are higher in white women, breast cancer mortality rates are higher in black women (black to white rate ratio of 0.9 for incidence and 1.4 for mortality). For the other four cancer sites, incidence rates, like mortality rates, are higher among blacks than whites. The largest ratios of mortality rates were the ratios of black to white for cervical cancer and prostate cancer mortality rates; 1.8 and 1.9, respectively. The ratio of black to white cervical cancer incidence rates was 1.6, and the ratio of black to white prostate cancer incidence rates was 1.7. Colorectal cancer black to white ratios for mortality and incidence rates were both 1.4 and lung cancer ratios for mortality and incidence rates were 1.2 and 1.3, respectively.

Five-year survival rates for each of the five cancer sites reveal a disparity in survival between blacks and whites. For breast and cervical cancer, blacks have a lower survival rate than whites even when cancers are detected at the same stage. The five-year survival rates for colorectal cancer are also lower for blacks than whites. Survival rates for lung cancer detected at a localized, regional, or distant stage are lower for blacks than whites. When prostate cancer is detected at a localized or regional stage, the five-year survival rates are 100% for both blacks and whites, but as cancers are detected at a later stage, the five-year survival rates among blacks become lower than the rates among whites. Compounding this survival disparity between races is the fact that in 2002, breast, cervical, and lung cancer cases were diagnosed at the localized stage with less frequency among blacks as compared to whites. However, prostate cancer cases were diagnosed more frequently in the localized state among blacks compared to whites. Colorectal cancer cases were diagnosed at the localized stage with approximately the same frequency among whites and blacks.

Significant differences in incidence and mortality rates among counties for each of the five sites over a ten-year period are shown in Figures 1, 2, 4, 5, 7, 8, 10, 11, 13 and 14.

Figures 3, 6, 9, 12, and 15, present maps of the percentage of cases diagnosed when the cancer was at the localized and/or in-situ stage between the time periods of 1990 through 1992 and 2000 through 2002. Cancers diagnosed at an early stage improved most dramatically for prostate, although improvements in early diagnosis are also seen for breast, cervical and colorectal cancers (changes in the state as a whole are listed in Tables 3, 4, 5, 6, and 7 in the Appendix to this report). Statewide the percentage of prostate cancer cases detected while localized changed from 59.2% in 1990-1992 to 76.4% in 2000-2002. Detection of breast cancer while localized, cervical cancer while in-situ, and colorectal cancer while localized showed modest improvement in Michigan. In the timeframe of 1990-1992, 55.4% of breast cancers were diagnosed at the localized stage in Michigan; 60.0% of breast cancer were diagnosed at the localized stage in the time period from 2000 through 2002. Cervical cancer detection while in-situ improved from 81.1% in 1990-1992 to 87.2% in 2000-2002. Colorectal cancer detection at the localized stage improved from 32.3% in 1990-1992 to 38.3% in 2000-2002. Lung cancer detection at the localized stage did not noticeably change (statewide the percentage of cases detected while the cancer was localized went from 19.8% to 18.7%). Observed differences in the percentage of cancers diagnosed while localized or in-situ may possibly be due to changes in early detection, changes in coding or pathology review and reporting, changes in record keeping, or due to the introduction of new medical practitioners or facilities.

Table 1.

Number of Cancer Deaths and New Cancer Cases  
by *Age Group* and *Gender*, All Sites, Michigan 2002-03

		All Ages	Under 35	35-54	55-74	75 and Over
Deaths, 2003	Total	19,574	232	2,396	8,277	8,669
	Males	10,107	126	1,213	4,511	4,257
	Females	9,467	106	1,183	3,766	4,412
New Cases, 2002	Total	49,872	1,766	9,478	24,080	14,548
	Males	26,209	799	4,087	14,011	7,312
	Females	23,639	967	5,387	10,053	7,232

Table 2.

Cancer Mortality and Incidence Rates  
by *Gender* and *Race*, All Sites, Michigan 2002-03

		Rate per 100,000*		Ratio
		Blacks	Whites	Blacks/Whites
2003 Mortality	Total	233.4	187.7	1.2
	Males	297.9	230.5	1.3
	Females	191.2	158.9	1.2
2002 Incidence	Total	560.7	478.3	1.2
	Males	736.0	560.6	1.3
	Females	441.5	420.3	1.1

\*Rates are age-adjusted and computed by race and gender.

Table 3.

### Estimated Number of Breast Cancer Deaths and New Breast Cancer Cases, Michigan 2005

Deaths	1,380
New Cases	7,210

Table 4.

### Number of Breast Cancer Deaths and New Breast Cancer Cases by *Age Group*, Michigan 2002-03

	All Ages	Under 35	35-54	55-74	75 and Over
Deaths, 2003	1,425	14	330	531	550
New Cases, 2002	6,998	119	2,148	3,155	1,576

Table 5.

## Breast Cancer Mortality Rates, Michigan 2003 vs. US 2002

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (2003)	US-SEER (2002)
Total	1,425	24.7	25.5
Whites	1,189	23.7	24.9
Blacks	219	32.9	34.1

\*Rate per 100,000 race- and gender-specific population.

Table 6.

## Breast Cancer Incidence Rates, Michigan 2002 vs. US 2002

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (2002)	US-SEER (2002)
Total	6,998	127.4	132.9
Whites	6,008	127.1	138.2
Blacks	803	120.6	120.0

\*Rate per 100,000 age- and gender-specific population.

Table 7.

### Age-specific Breast Cancer Mortality Rates, Michigan 2003

	Number	Rate*
25-39 Years	46	4.5
40-49 Years	154	19.2
50-64 Years	406	47.5
65 Years and Over	819	113.0

\*Rate per 100,000 age- and gender-specific population.

Table 8.

### Age-specific Breast Cancer Incidence Rates, Michigan 2002

	Number	Rate*
25-39 Years	321	30.9
40-49 Years	1151	144.1
50-64 Years	2474	299.9
65 Years and Over	3049	422.5

\*Rate per 100,000 age- and gender-specific population.

Table 9.

### Breast Cancer Five-Year Relative Survival Rates by Stage at Diagnosis and *Race*, US 1995-2001

	Total %	White %	Black %
All stages	88.2	89.5	75.9
Localized	97.9	98.5	92.2
Regional	81.3	82.9	68.3
Distant	26.1	27.7	16.3
Unknown	55.6	57.5	46.4

Table 10.

### Numbers and Percentages of Invasive Breast Cancer by Stage at Diagnosis and *Race*, Michigan Residents, 2002

		Stage at Diagnosis							
	Total Number	Localized		Regional		Distant		Unknown	
		Number	%	Number	%	Number	%	Number	%
Total	6,999	4,251	60.7	1,746	24.9	288	4.1	714	10.2
Whites	6,008	3,752	62.5	1,497	24.9	214	3.6	545	9.1
Blacks	803	399	49.7	201	25.0	70	8.7	133	16.6

Figure 1.

## Breast Cancer Mortality Rates by County, 1994-2003

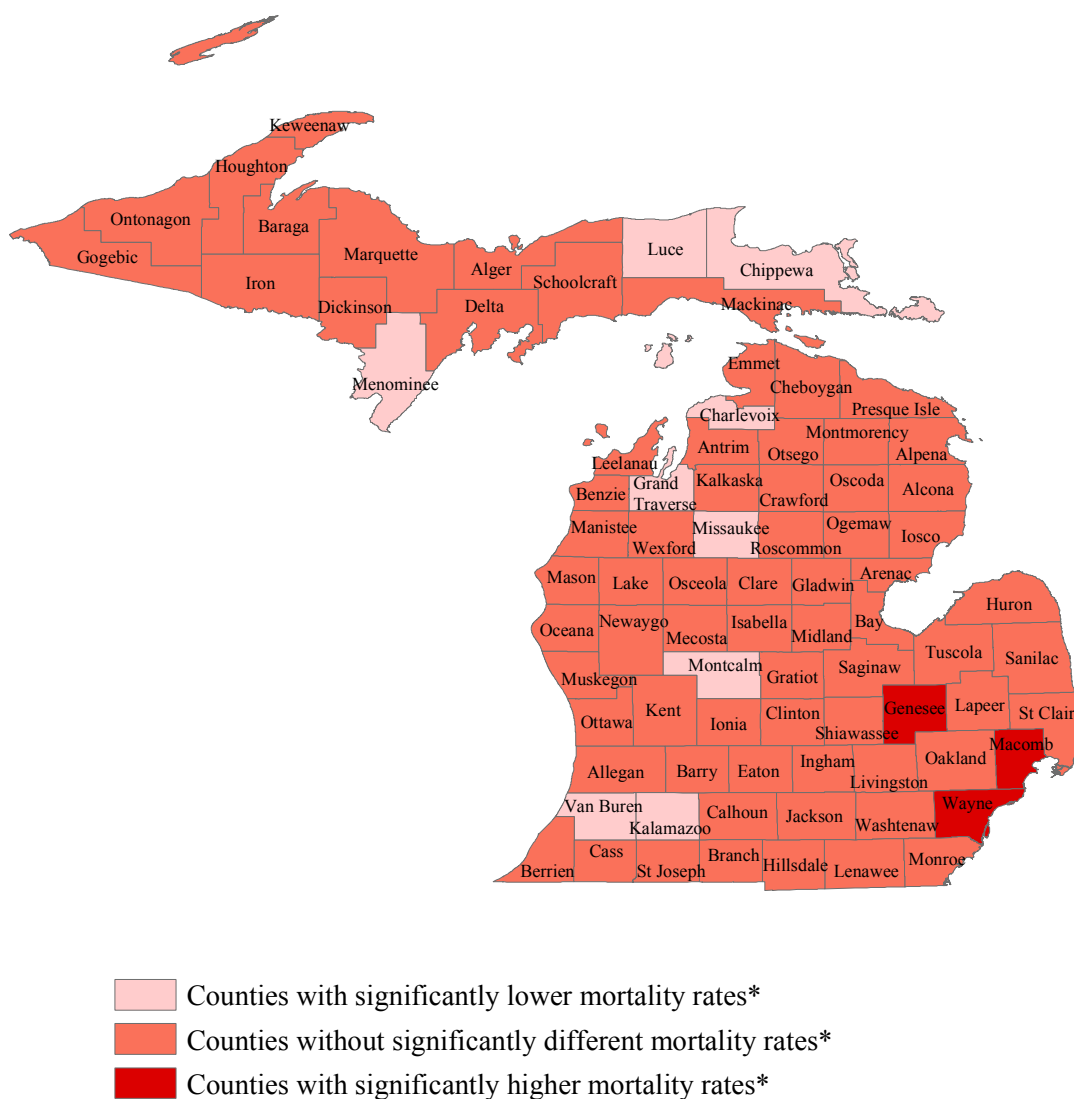
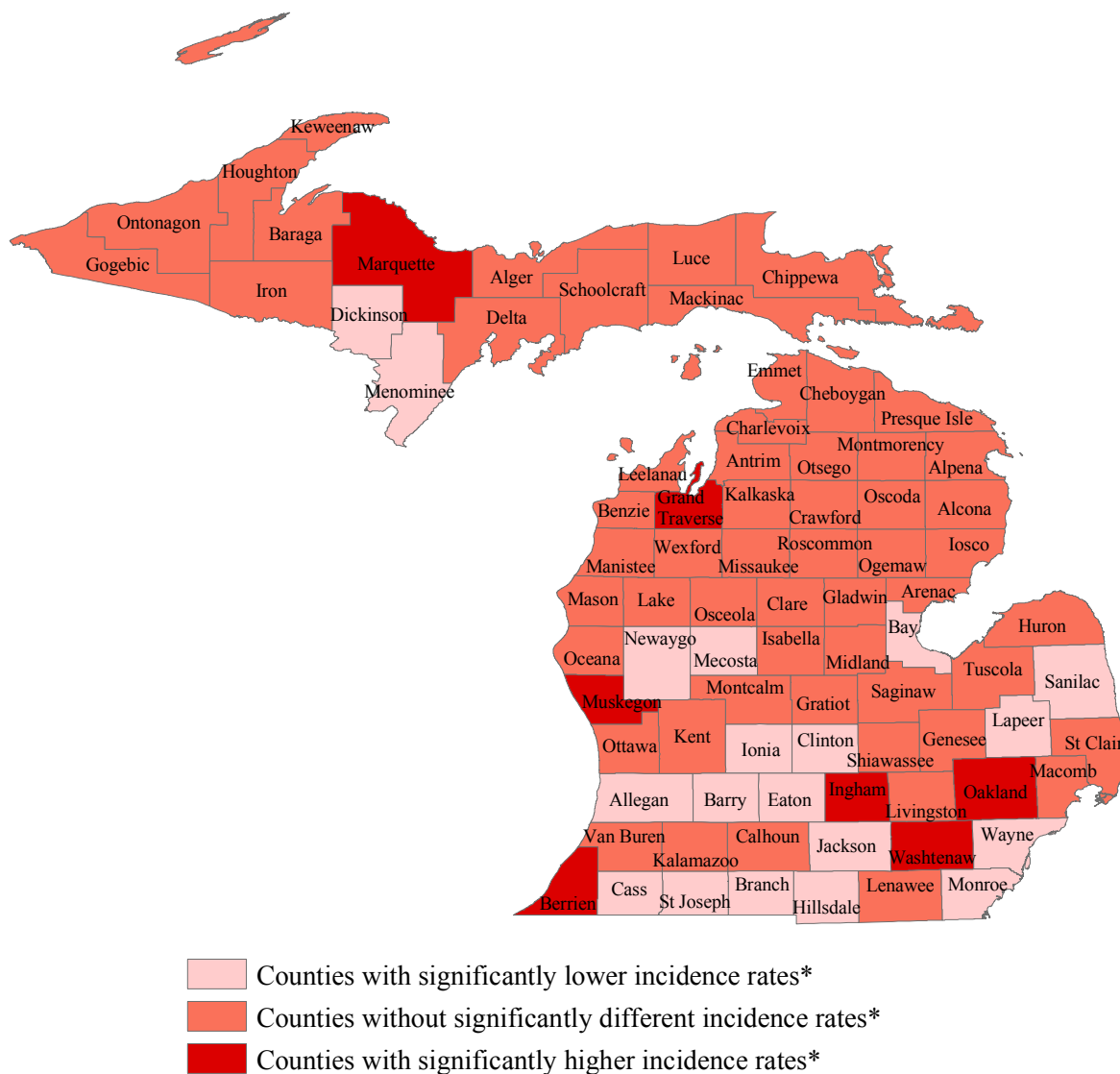


Figure 2.

## Breast Cancer Incidence Rates by County, 1993-2002



\*Differences in age-adjusted incidence rates were statistically tested at 95% confidence levels to compare each county with the all-county rate.

Figure 3.

## Percentage of Breast Cancer Cases Localized at Diagnosis by County

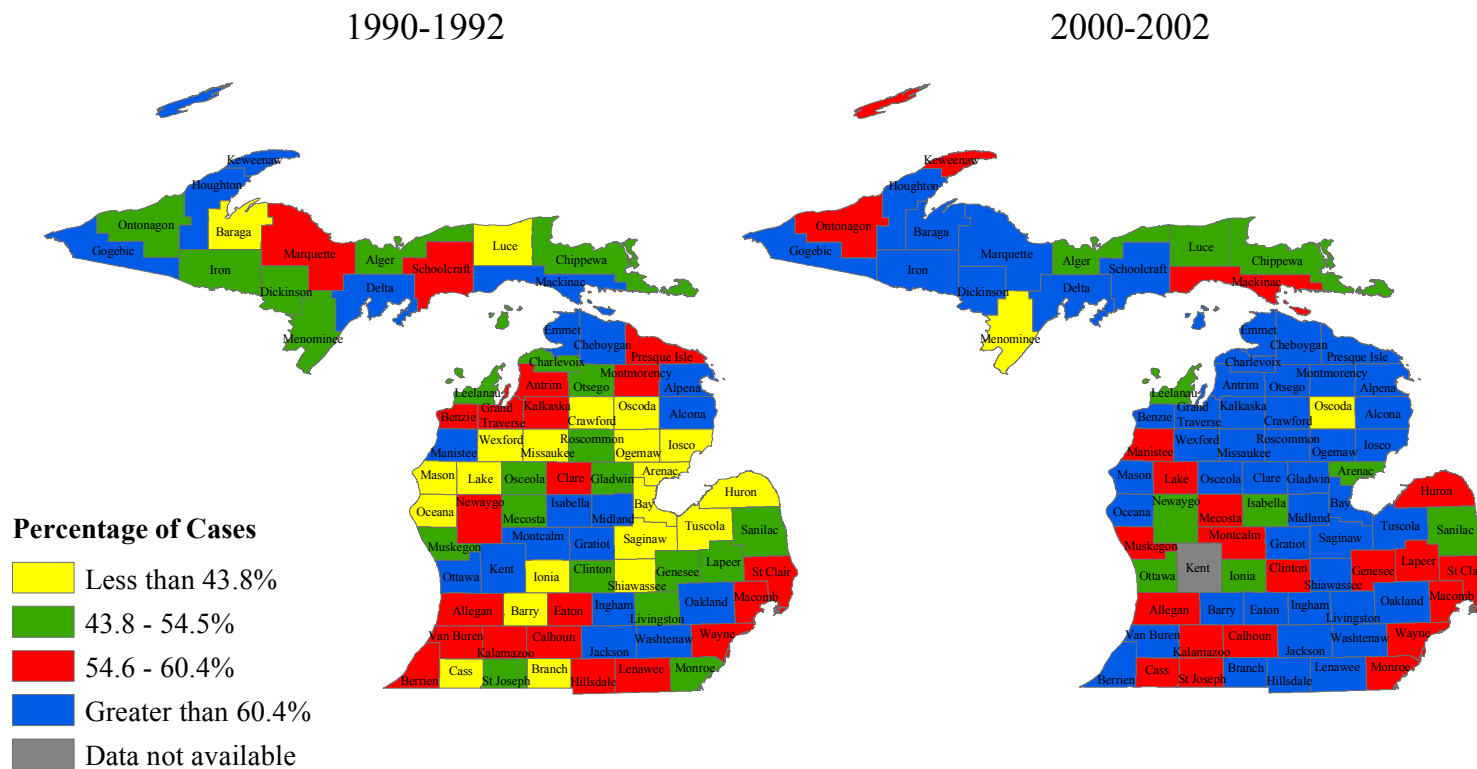


Table 11.

## Mammography Workloads by County, 1996-1999 and 2000-2003

County	Avg mammograms / 1000 female >= 40 years (1996-1999) *based on 1998 population	Avg mammograms / 1000 females >= 40 years (2000-2003) *based on 2002 population	% Change*
Ionia	93.4	280.1	199.9
Cass	97.7	213.1	118.1
Monroe	116.4	241.0	107.1
Gladwin	245.1	501.2	104.5
St. Clair	475.7	882.4	85.5
Houghton	344.1	612.3	78.0
Crawford	710.8	1246.1	75.3
Berrien	373.3	630.5	68.9
Arenac	200.6	322.2	60.6
Bay	332.9	531.5	59.6
Newaygo	288.5	449.8	55.9
Barry	238.0	366.3	53.9
Charlevoix	373.1	557.4	49.4
Isabella	520.3	768.7	47.7
Otsego	612.6	881.6	43.9
Eaton	209.0	300.4	43.8
Mecosta	573.7	811.6	41.5
Manistee	268.0	372.1	38.8
Van Buren	236.3	327.9	38.8
Montcalm	426.9	592.4	38.8
Saginaw	521.4	722.7	38.6
St. Joseph	329.0	453.6	37.9
Allegan	431.1	591.8	37.3
Kalamazoo	606.6	825.6	36.1
Kent	585.7	794.2	35.6
Calhoun	516.3	697.2	35.0
Ottawa	225.9	301.6	33.5
Genesee	599.3	777.1	29.7
Livingston	258.4	332.7	28.8
Kalkaska	346.3	444.8	28.5
Wexford	805.4	1029.2	27.8
Cheboygan	420.3	533.3	26.9
Shiawassee	414.5	516.8	24.7
Sanilac	258.2	321.9	24.6
Midland	653.9	796.8	21.9
Huron	418.6	508.2	21.4
Menominee	627.7	749.2	19.4
Schoolcraft	516.8	609.2	17.9
Oakland	707.6	832.6	17.7

**Selected Cancer Sites**  
**Breast Cancer**

County	Avg mammograms / 1000 (1996-1999)	Avg mammograms / 1000 (2000-2003)	% Change*
Hillsdale	295.7	345.3	16.8
Wayne	425.9	492.0	15.5
Gratiot	621.2	717.0	15.4
Iron	296.4	341.1	15.1
Muskegon	556.8	640.5	15.0
Clare	260.6	298.6	14.5
Lenawee	375.7	424.4	12.9
Ogemaw	692.8	782.4	12.9
Ingham	967.6	1092.7	12.9
Macomb	413.2	459.1	11.1
Marquette	801.5	885.1	10.4
Emmet	1242.5	1352.5	8.9
Lapeer	343.2	373.4	8.8
Washtenaw	1152.5	1250.3	8.5
Chippewa	428.6	461.8	7.7
Osceola	259.3	271.1	4.6
Jackson	564.0	583.1	3.4
Clinton	182.6	188.4	3.1
Gogebic	457.8	453.3	-1.0
Dickinson	814.1	794.3	-2.4
Grand Traverse	1234.7	1200.2	-2.8
Iosco	600.5	580.9	-3.3
Mason	612.2	567.9	-7.2
Branch	417.0	371.1	-11.0
Luce	920.1	809.4	-12.0
Baraga	532.8	467.2	-12.3
Oceana	440.6	381.0	-13.5
Leelanau	135.7	117.0	-13.8
Alpena	888.1	754.4	-15.1
Alger	321.3	270.1	-16.0
Benzie	332.7	270.8	-18.6
Ontonagon	208.7	165.5	-20.7
Tuscola	156.1	120.8	-22.6
Lake	184.5	137.5	-25.5
Presque isle	346.8	253.9	-26.8
Roscommon	454.5	213.3	-53.1
Alcona	n/a	n/a	n/a
Antrim	n/a	n/a	n/a
Delta	0.0	287.8	n/a
Keweenaw	n/a	n/a	n/a
Mackinac	0.0	402.2	n/a
Missaukee	n/a	n/a	n/a
Montmorency	n/a	n/a	n/a
Oscoda	n/a	n/a	n/a

\*n/a = no mammography information available for this county

Table 12.

Estimated Number of Cervical Cancer Deaths and  
New Cervical Cancer Cases,  
Michigan 2005

Deaths	*
New Cases	340

\*Not Available

Table 13.

Number of Cervical Cancer Deaths and  
New Cervical Cancer Cases by *Age Group*,  
Michigan 2002-03

	All Ages	Under 35	35-54	55-74	75 and Over
Deaths, 2003	104	5	36	37	26
New Cases, 2001	382	64	198	79	41

Table 14.

### Cervical Cancer Mortality Rates, Michigan 2003 vs. US 2002

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (2003)	US-SEER (2002)
Total	104	1.9	2.5
Whites	81	1.7	2.3
Blacks	21	3.1	5.0

\*Rate per 100,000 age- and gender-specific population.

Table 15.

### Cervical Cancer Incidence Rates, Michigan 2002 vs. US 2002

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (2002)	US-SEER (2002)
Total	382	7.3	7.2
Whites	290	6.7	6.8
Blacks	76	10.9	10.3

\*Rate per 100,000 age- and gender-specific population.

Table 16.

## Age-specific Cervical Cancer Mortality Rates, Michigan 2003

	Number	Rate*
25-39 Years	7	0.7
40-49 Years	20	2.5
50-64 Years	31	3.6
65 Years and Over	45	6.2

\*Rate per 100,000 age- and gender-specific population.

Table 17.

## Age-specific Cervical Cancer Incidence Rates, Michigan 2002

	Number	Rate*
25-39 Years	112	10.8
40-49 Years	99	12.4
50-64 Years	95	11.5
65 Years and Over	72	10.0

\*Rate per 100,000 age- and gender-specific population.

Table 18.

### Cervical Cancer Five-Year Relative Survival Rates by Stage at Diagnosis and *Race*, US 1995-2001

	Total %	White %	Black %
All stages	73.3	74.6	66.1
Localized	92.4	92.8	88.4
Regional	54.7	55.3	48.2
Distant	16.5	17.7	12.5
Unknown	61.4	64.5	56.6

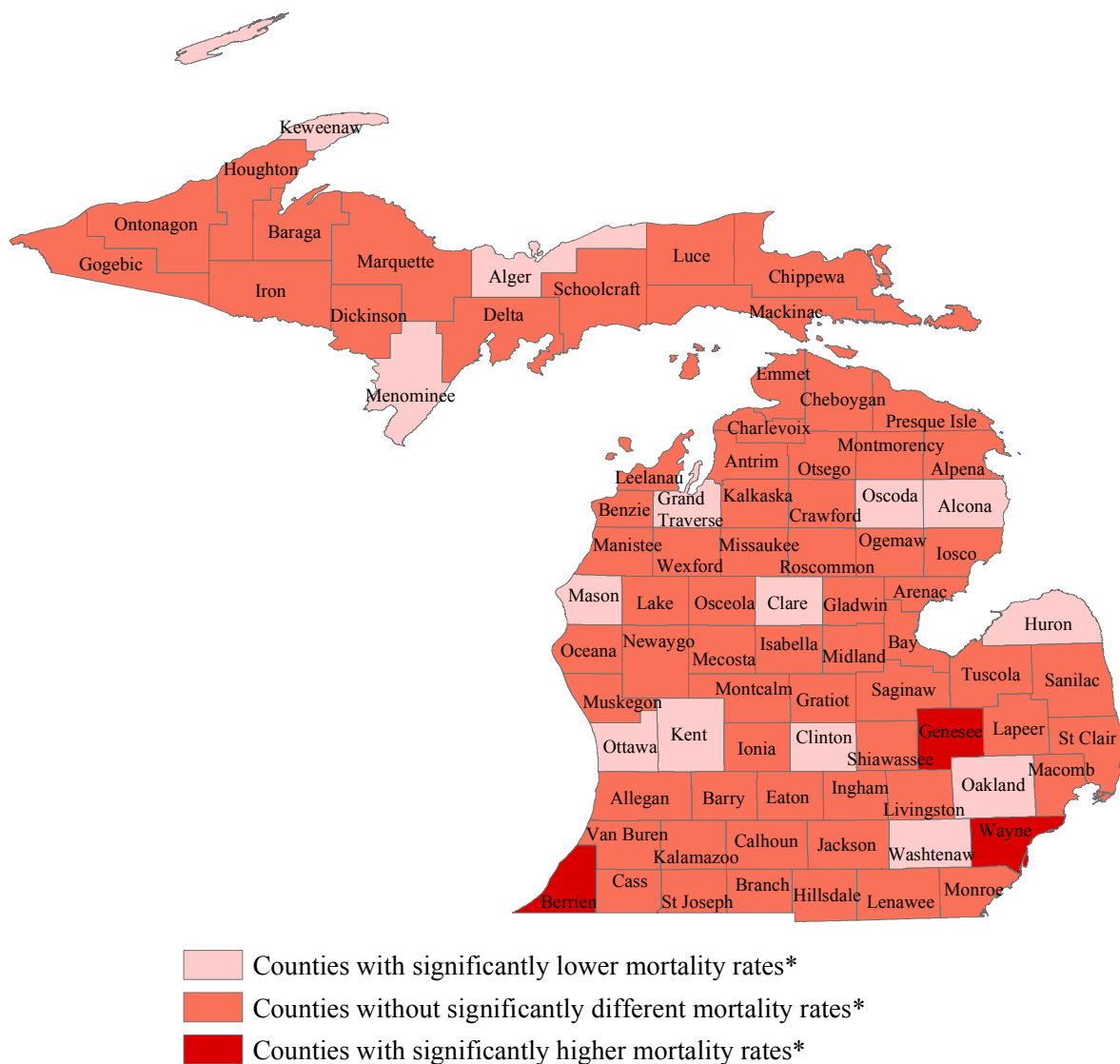
Table 19.

### Numbers and Percentages of Invasive Cervical Cancer (Primary Site) by Stage at Diagnosis and *Race*, Michigan 2002

		Stage at Diagnosis							
	Total Number	Localized		Regional		Distant		Unknown	
		Number	%	Number	%	Number	%	Number	%
Total	382	193	50.5	93	24.3	39	10.2	57	14.9
Whites	290	161	55.5	68	23.4	29	10.0	32	11.0
Blacks	76	26	34.2	21	27.6	8	10.5	21	27.6

Figure 4.

## Cervical Cancer Mortality Rates by County, 1994-2003



\*Differences in age-adjusted mortality rates were statistically tested at 95% confidence levels to compare each county with the all-county rate.

A map of Michigan showing its 83 counties, each labeled with its name. The counties are shaded in three colors to represent population density in 2010: dark red for high density, medium red for medium density, and light pink for low density. The map shows a clear trend where population density increases from the western and northern parts of the state towards the eastern and southern parts, particularly around the Detroit metropolitan area and the Lake Michigan shoreline.

- Counties with significantly lower incidence rates\*  
 Counties without significantly different incidence rates\*  
 Counties with significantly higher incidence rates\*

24

Figure 6.

## Percentage of Cervical Cancer Cases In-situ at Diagnosis by County

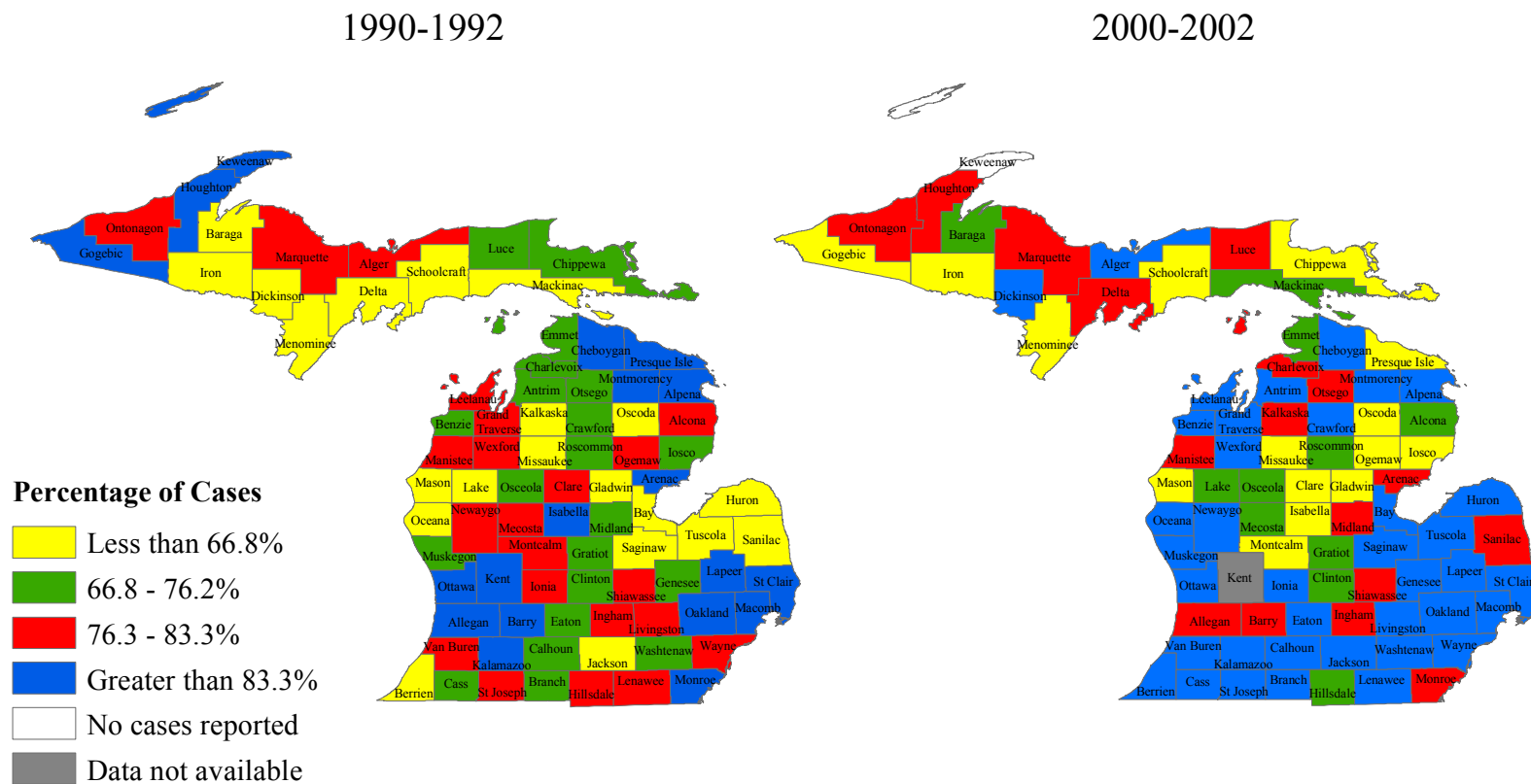


Table 20.

Estimated Number of Colorectal Cancer Deaths and  
New Colorectal Cancer Cases,  
Michigan 2005

Deaths	1,870
New Cases	4,830

Table 21.

Number of Colorectal Cancer Deaths and  
New Colorectal Cancer Cases  
by *Age Group* and *Gender*,  
Michigan 2002-03

		All Ages	Under 35	35-54	55-74	75 and Over
Deaths, 2003	Total	1,916	12	184	690	1,030
	Males	951	6	108	397	440
	Females	965	6	76	293	590
New Cases, 2002	Total	5,421	63	799	2,353	2,206
	Males	2,676	31	432	1,289	924
	Females	2,741	32	367	1,062	1,280

Table 22.

## Colorectal Cancer Mortality Rates by *Gender*, Michigan 2003 vs. US 2002

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (2003)	US-SEER (2002)
Total	1,916	18.8	19.6
Males	951	22.5	23.8
White Males	805	21.6	23.2
Black Males	136	30.7	33.4
Females	965	16.0	16.5
White Females	816	15.2	16.0
Black Females	140	22.0	22.8

\*Rate per 100,000 race- and gender-specific population.

Table 23.

## Colorectal Cancer Incidence Rates by *Gender*, Michigan 2002 vs. US 2002

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (2002)	US-SEER (2002)
Total	5,421	54.0	51.9
Males	2,676	61.8	59.9
White Males	2,257	59.2	58.5
Black Males	363	81.2	72.9
Females	2,741	47.8	45.6
White Females	2,281	45.2	44.8
Black Females	392	62.3	54.5

\*Rate per 100,000 race- and gender-specific population.

Table 24.

## Age-specific Colorectal Cancer Mortality Rates by *Gender*, Michigan 2003

	Total		Males		Females	
	Number	Rate*	Number	Rate*	Number	Rate*
25-39 Years	27	1.3	14	1.4	13	1.3
40-49 Years	78	4.9	45	5.7	33	4.1
50-64 Years	354	21.2	213	26.0	141	16.5
65 Years and Over	1,454	117.6	677	132.3	777	107.2

\*Rate per 100,000 age- and gender-specific population.

Table 25.

## Age-specific Colorectal Cancer Incidence Rates by *Gender*, Michigan 2002

	Total		Males		Females	
	Number	Rate*	Number	Rate*	Number	Rate*
25-39 Years	136	6.5	76	7.3	60	5.8
40-49 Years	360	22.8	179	22.9	181	22.7
50-64 Years	1,281	79.4	749	94.9	531	64.4
65 Years and Over	3,627	294.4	1,667	326.6	1,957	271.2

\*Rate per 100,000 age- and gender-specific population.

Table 26.

Colorectal Cancer Five-Year Relative Survival Rates  
by Stage at Diagnosis, *Gender* and *Race*, US 1995-2001

	Total %	Males		Females	
		White %	Black %	White %	Black %
All stages	64.1	65.6	55.9	64.4	54.3
Localized	90.4	92.0	86.1	89.6	82.3
Regional	67.9	68.8	61.6	68.8	60.5
Distant	9.7	9.8	8.4	10.1	7.7
Unknown	35.4	39.5	43.2	31.2	34.6

Table 27.

Numbers and Percentages of Invasive Colorectal Cancer  
(Primary Site) by Stage at Diagnosis and *Race*,  
Michigan 2002

	Total Number	Stage at Diagnosis							
		Localized		Regional		Distant		Unknown	
		Number	%	Number	%	Number	%	Number	%
Total	5,421	2,140	39.5	1,706	31.5	833	15.4	742	13.7
Whites	4,540	1,789	39.4	1,500	33.0	685	15.1	566	12.5
Blacks	755	301	39.9	181	24.0	135	17.9	138	18.3

Figure 7.

## Colorectal Cancer Mortality Rates by County, 1994-2003

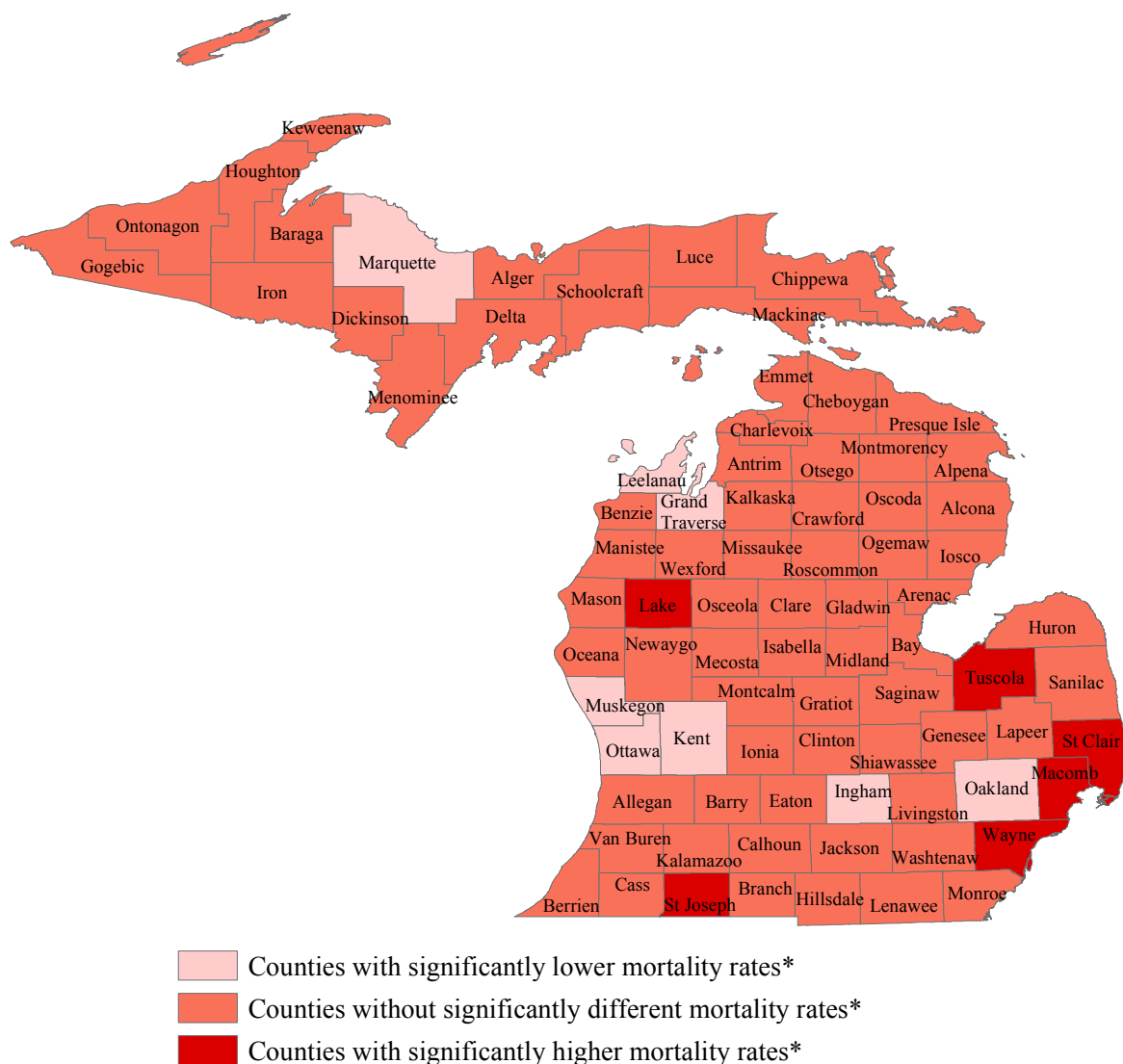
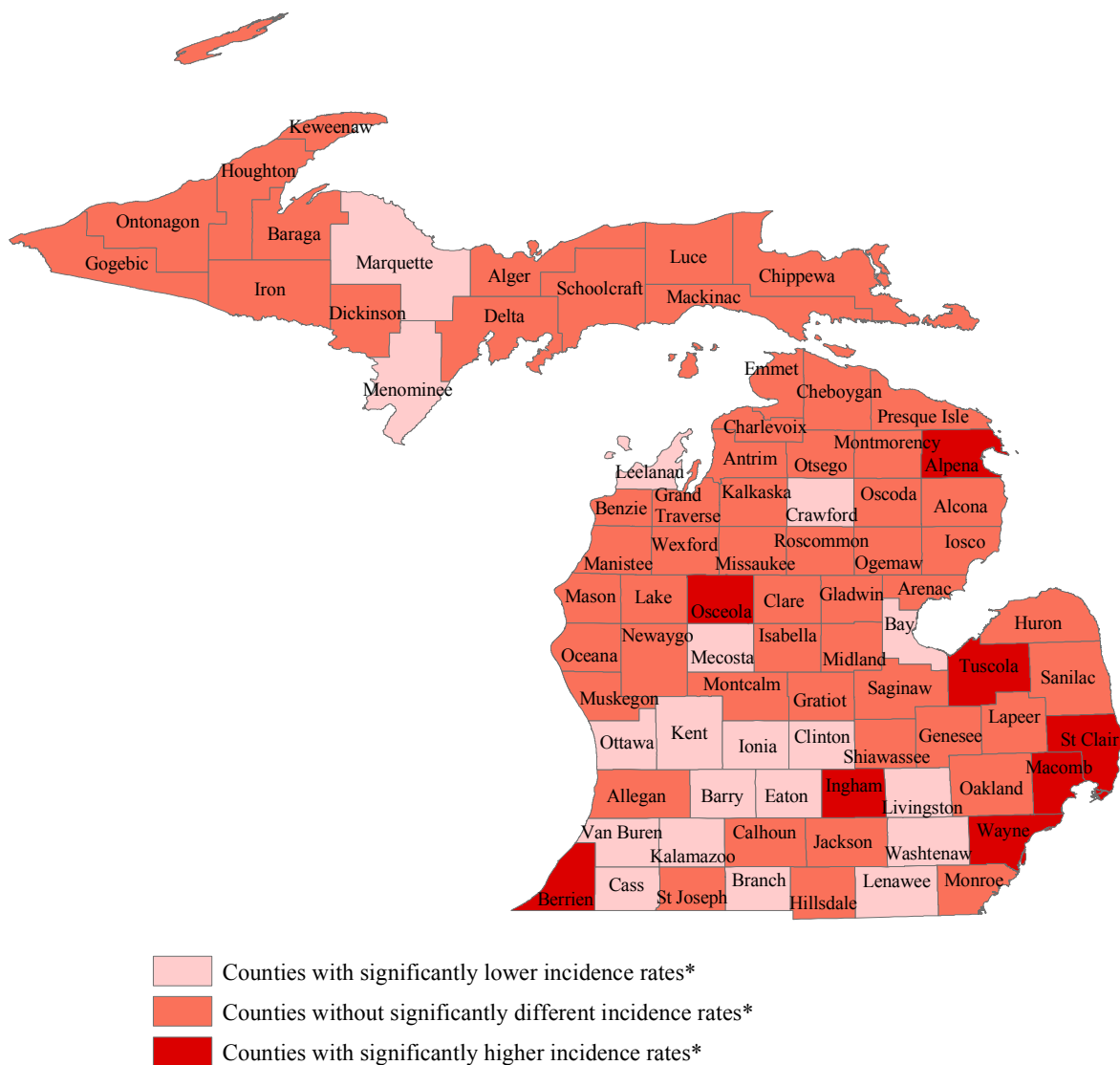


Figure 8.

## Colorectal Cancer Incidence Rates by County, 1993-2002



\*Differences in age-adjusted incidence rates were statistically tested at 95% confidence levels to compare each county with the all-county rate.

Figure 9.

## Percentage of Colorectal Cancer Cases Localized at Diagnosis by County

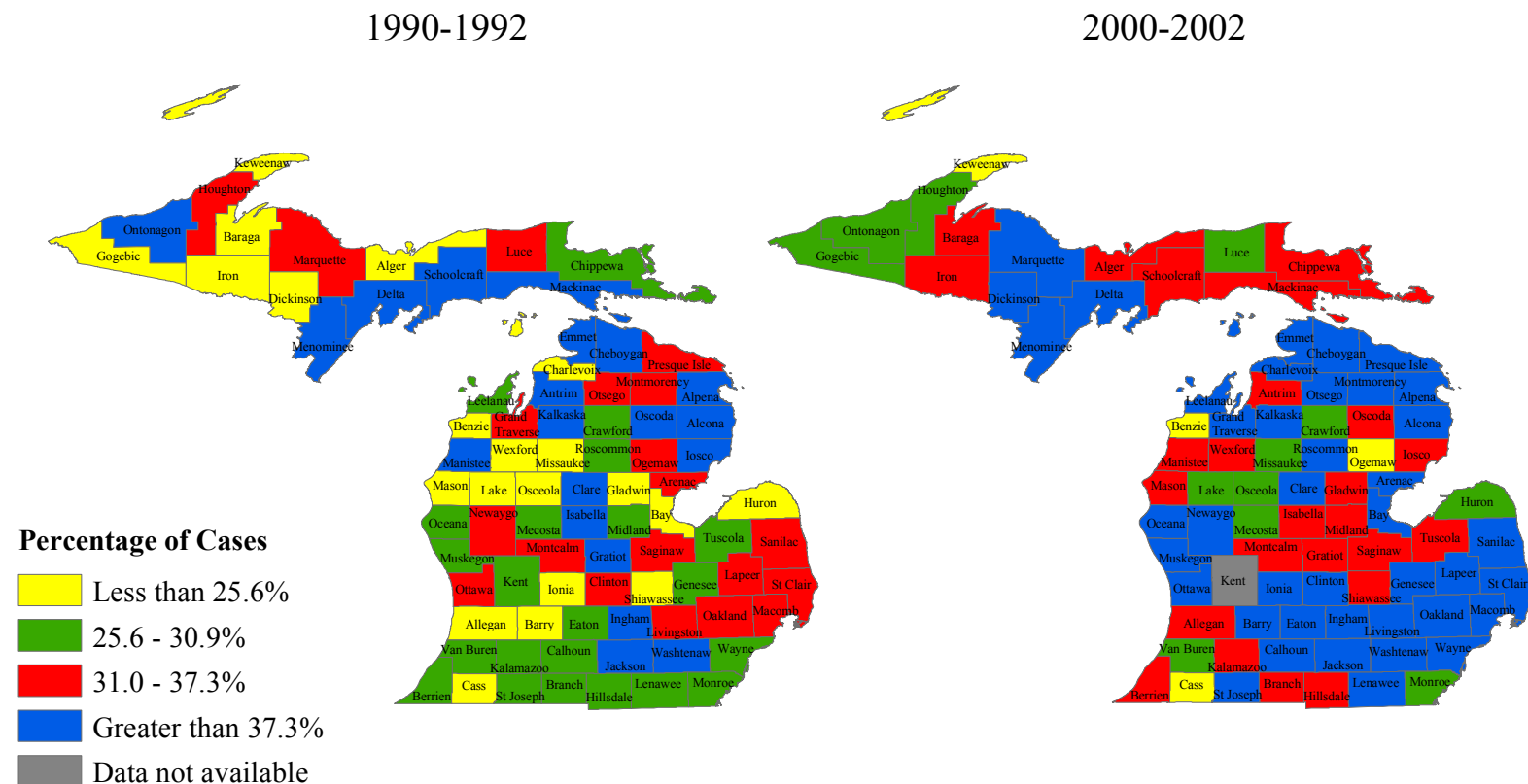


Table 28.

Estimated Number of Lung Cancer Deaths and  
New Lung Cancer Cases,  
Michigan 2005

Deaths	5,790
New Cases	6,110

Table 29.

Number of Lung Cancer Deaths and  
New Lung Cancer Cases  
by *Age Group* and *Gender*,  
Michigan 2002-03

		All Ages	Under 35	35-54	55-74	75 and Over
Deaths, 2003	Total	5,680	6	579	2,881	2,214
	Males	3,174	4	333	1,641	1,196
	Females	2,506	2	246	1,240	1,018
New Cases, 2002	Total	7,020	13	790	3,902	2,315
	Males	3,892	6	428	2,198	1,260
	Females	3,126	7	362	1,702	1,055

Table 30.

## Lung Cancer Mortality Rates by *Gender*, Michigan 2003 vs. US 2002

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (2003)	US-SEER (2002)
Total	5,680	56.1	54.9
Males	3,174	72.9	73.5
White Males	2,716	70.7	72.7
Black Males	438	98.5	95.7
Females	2,506	43.9	41.5
White Females	2,168	43.5	42.6
Black Females	300	47.2	40.2

\*Rate per 100,000 race- and gender-specific population.

Table 31.

## Lung Cancer Incidence Rates by *Gender*, Michigan 2002 vs. US 2002

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (2002)	US-SEER (2002)
Total	7,020	70.1	62.1
Males	3,892	89.3	77.8
White Males	3,308	85.9	77.1
Black Males	534	120.8	110.4
Females	3,126	56.2	50.8
White Females	2,666	54.9	52.4
Black Females	415	66.0	59.9

\*Rate per 100,000 race- and gender-specific population.

Table 32.

## Age-specific Lung Cancer Mortality Rates by *Gender*, Michigan 2003

	Total		Males		Females	
	Number	Rate*	Number	Rate*	Number	Rate*
25-39 Years	25	1.2	16	1.6	9	0.9
40-49 Years	264	16.6	153	19.4	111	13.8
50-64 Years	1,387	82.9	800	97.8	587	68.6
65 Years and Over	4,004	323.8	2,205	430.9	1,799	248.2

\*Rate per 100,000 age- and gender-specific population.

Table 33.

## Age-specific Lung Cancer Incidence Rates by *Gender*, Michigan 2002

	Total		Males		Females	
	Number	Rate*	Number	Rate*	Number	Rate*
25-39 Years	44	2.1	24	2.3	20	1.9
40-49 Years	360	22.8	200	25.6	160	20.0
50-64 Years	1,966	121.8	1,106	140.2	860	104.3
65 Years and Over	4,649	377.4	2,562	502.0	2,085	288.9

\*Rate per 100,000 age- and gender-specific population.

Table 34.

Lung Cancer Five-Year Relative Survival Rates  
by Stage at Diagnosis, *Gender* and *Race*, US 1995-2001

	Total %	Males		Females	
		White %	Black %	White %	Black %
All stages	15.3	13.7	11.6	17.7	15.6
Localized	49.5	45.6	40.2	54.1	48.3
Regional	16.2	15.4	13.4	17.6	16.6
Distant	2.1	1.8	1.6	2.3	1.6
Unknown	8.5	7.9	10.2	8.5	10.9

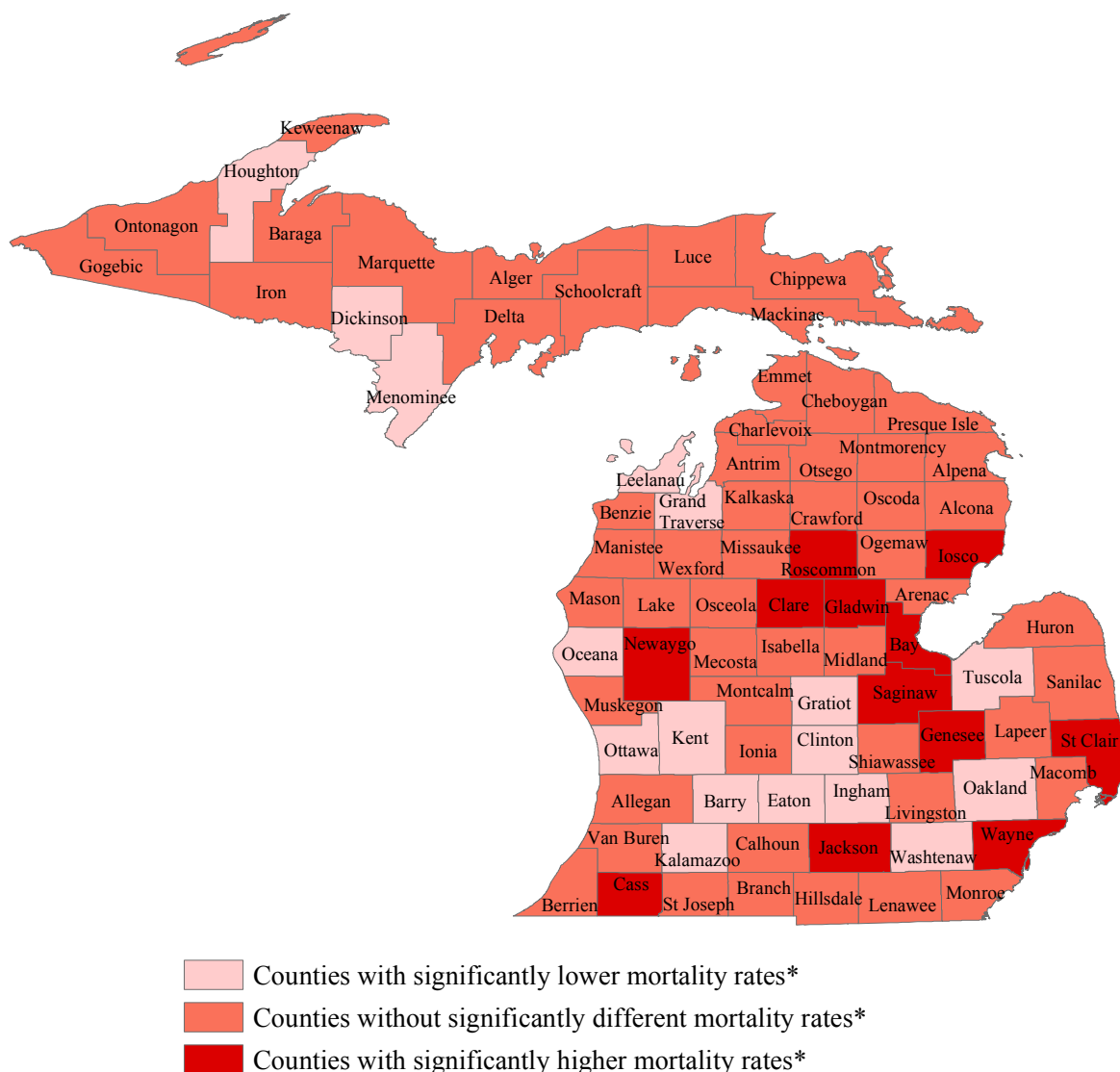
Table 35.

Numbers and Percentages of Invasive Lung Cancer  
(Primary Site) by Stage at Diagnosis and *Race*,  
Michigan 2002

	Total Number	Stage at Diagnosis							
		Localized		Regional		Distant		Unknown	
		Number	%	Number	%	Number	%	Number	%
Total	7,020	1,370	19.5	1,521	21.7	3,085	43.9	1,044	14.9
Whites	5,976	1,210	20.2	1,305	21.8	2,561	42.9	900	15.1
Blacks	949	144	15.2	196	20.7	483	50.9	126	13.3

Figure 10.

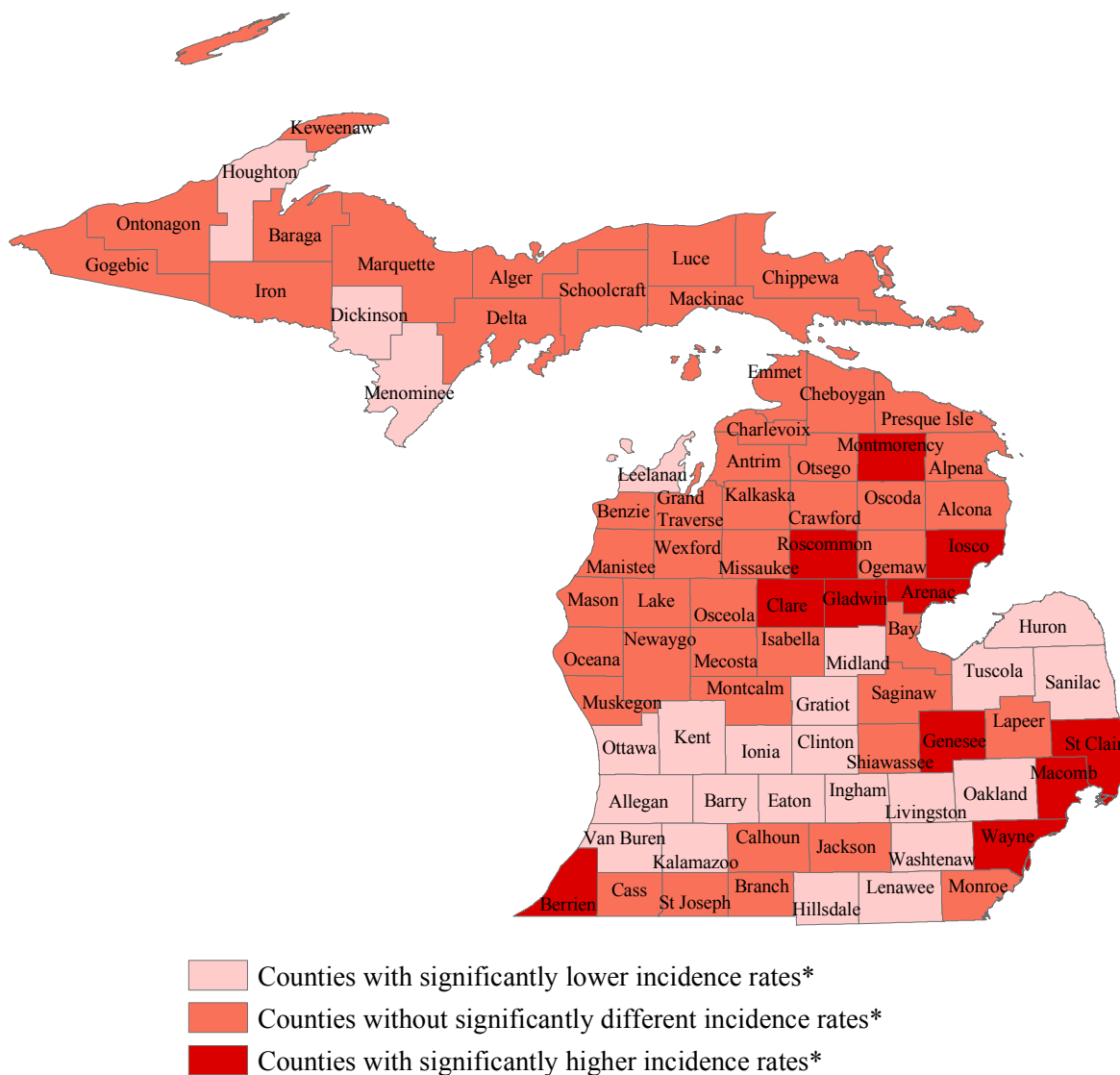
## Lung Cancer Mortality Rates by County, 1994-2003



\*Differences in age-adjusted mortality rates were statistically tested at 95% confidence levels to compare each county with the all-county rate.

Figure 11.

## Lung Cancer Incidence Rates by County, 1993-2002



\*Differences in age-adjusted incidence rates were statistically tested at 95% confidence levels to compare each county with the all-county rate.

Figure 12.

## Percentage of Lung Cancer Cases Localized at Diagnosis by County

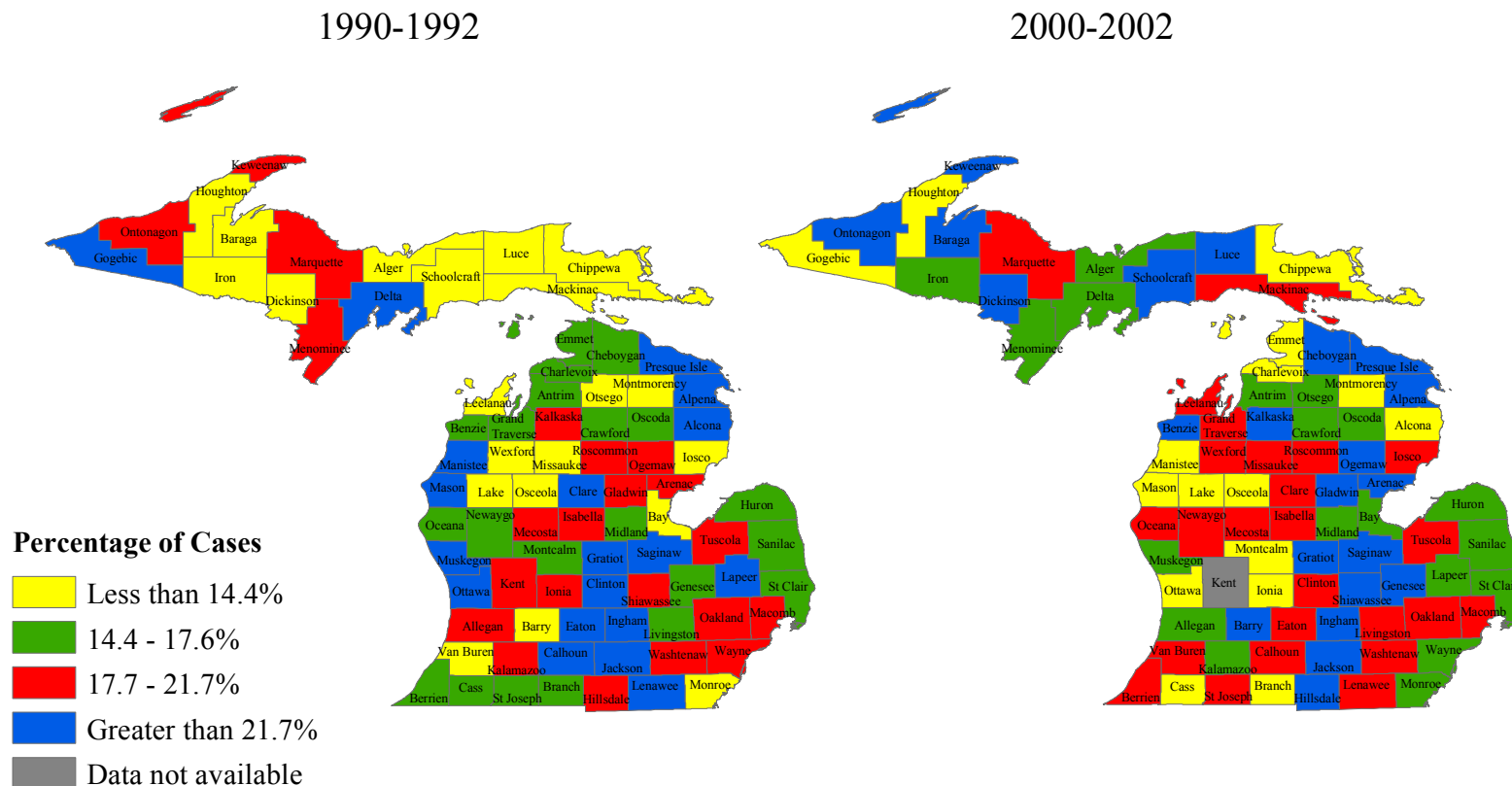


Table 36.

Estimated Number of Prostate Cancer Deaths and  
New Prostate Cancer Cases,  
Michigan 2005

Deaths	1,000
New Cases	7,650

Table 37.

Number of Prostate Cancer Deaths and  
New Prostate Cancer Cases by *Age Group*,  
Michigan 2002-03

	All Ages	Under 35	35-54	55-74	75 and Over
Deaths, 2003	985	0	18	265	702
New Cases, 2002	8,676	2	877	5,571	2,226

Table 38.

## Prostate Cancer Mortality Rates, Michigan 2003 vs. US 2002

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (2003)	US-SEER (2002)
Total	985	25.5	28.1
Whites	809	23.6	25.8
Blacks	169	44.7	63.0

\*Rate per 100,000 race- and gender-specific population.

Table 39.

## Prostate Cancer Incidence Rates, Michigan 2002 vs. US 2002

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (2002)	US-SEER (2002)
Total	8,676	195.0	176.3
Whites	6,768	171.8	171.9
Blacks	1,320	297.2	275.8

\*Rate per 100,000 race- and gender-specific population.

Table 40.

## Age-specific Prostate Cancer Mortality Rates, Michigan 2003

	Number	Rate*
25-39 Years	0	0.0
40-49 Years	4	0.5
50-64 Years	86	10.5
65 Years and Over	895	174.9

\*Rate per 100,000 age- and gender-specific population.

Table 41.

## Age-specific Prostate Cancer Incidence Rates, Michigan 2002

	Number	Rate*
25-39 Years	6	0.6
40-49 Years	276	35.3
50-64 Years	2,986	378.4
65 Years and Over	5,408	1,059.7

\*Rate per 100,000 age- and gender-specific population.

Table 42.

Prostate Cancer Five-Year Relative Survival Rates  
by Stage at Diagnosis and *Race*, US 1995-2001

	Total %	White %	Black %
All stages	99.8	99.9	96.7
Localized/Regional	100.0	100.0	100.0
Distant	33.5	32.6	30.3
Unknown	82.7	84.2	77.0

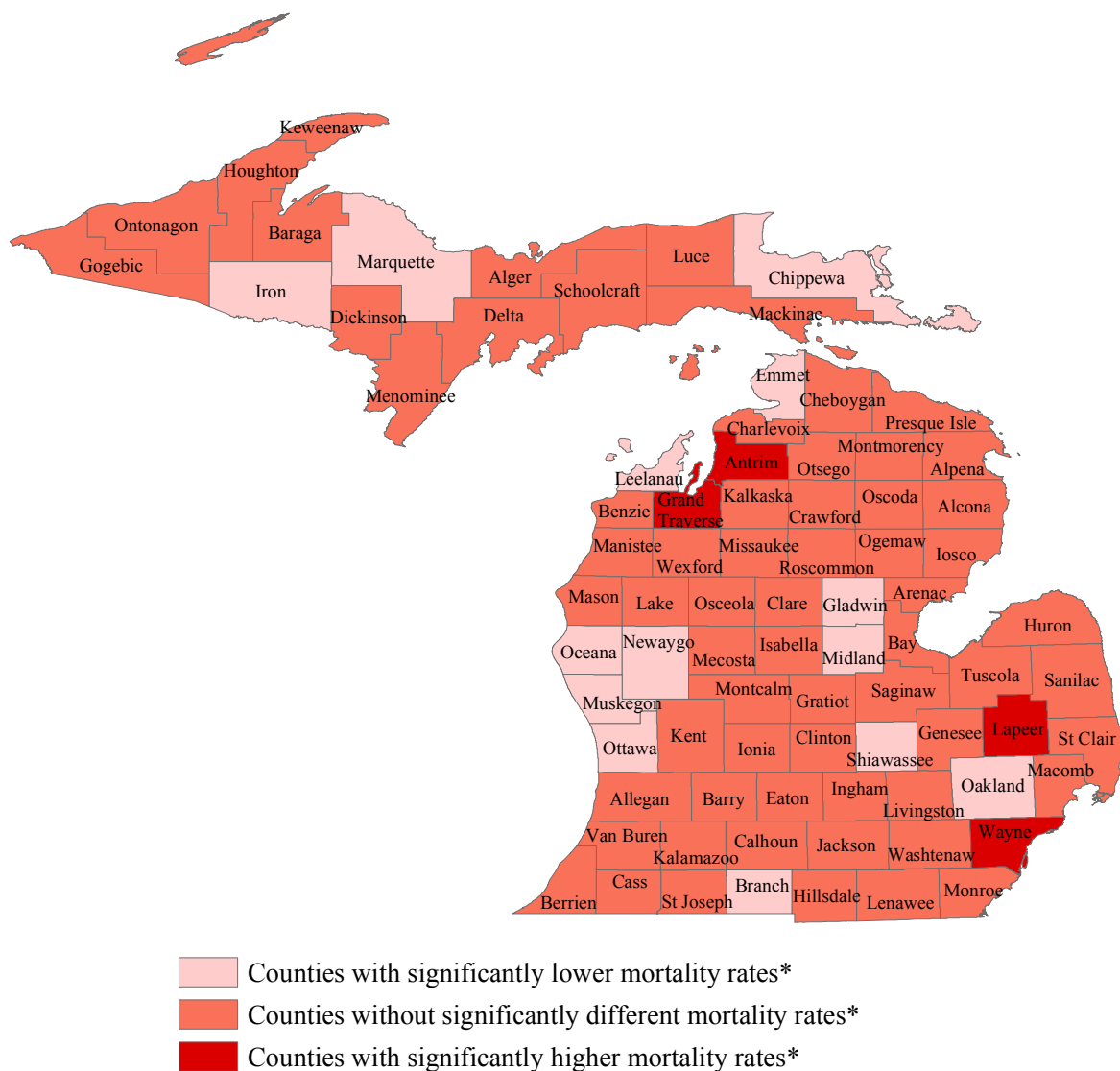
Table 43.

Numbers and Percentages of Invasive Prostate Cancer  
(Primary Site) by Stage at Diagnosis and *Race*,  
Michigan 2002

		Stage at Diagnosis							
	Total Number	Localized		Regional		Distant		Unknown	
		Number	%	Number	%	Number	%	Number	%
Total	8,677	6,951	80.1	700	8.1	192	2.2	834	9.6
Whites	6,768	5,429	80.2	597	8.8	131	1.9	611	9.0
Blacks	1,321	1,079	81.7	89	6.7	56	4.2	97	7.3

Figure 13.

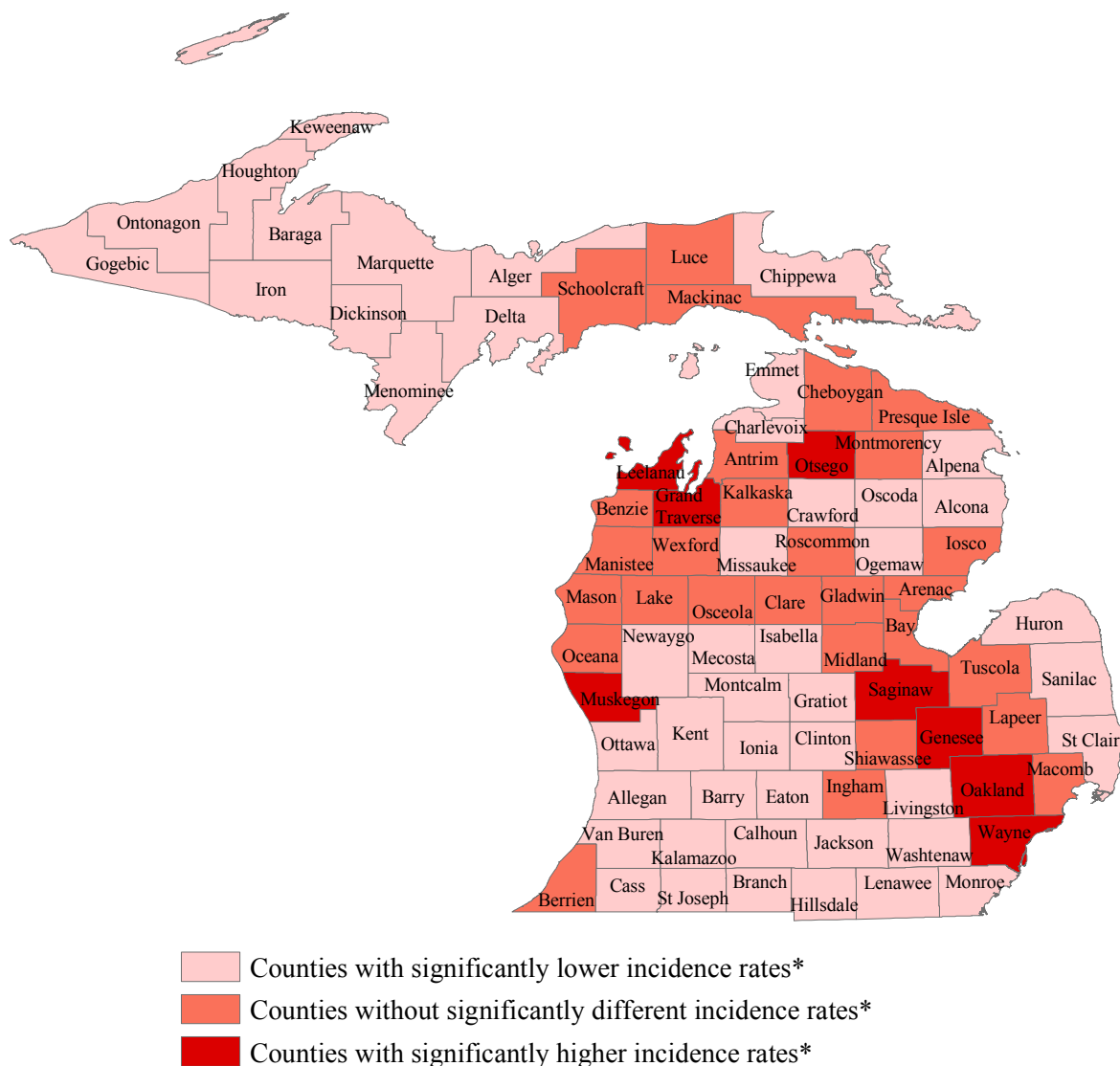
## Prostate Cancer Mortality Rates by County, 1994-2003



\*Differences in age-adjusted mortality rates were statistically tested at 95% confidence levels to compare each county with the all-county rate.

Figure 14.

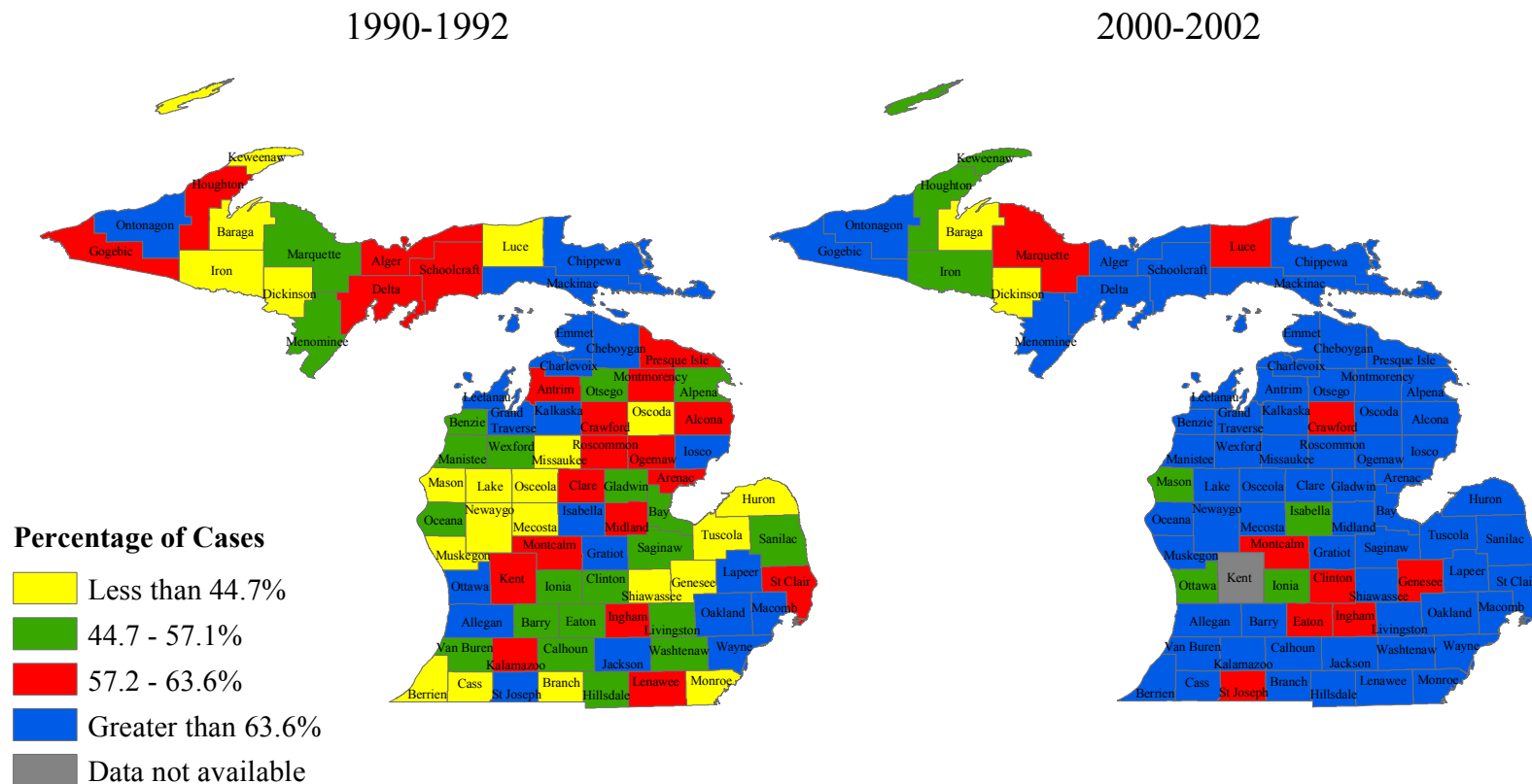
## Prostate Cancer Incidence Rates by County, 1993-2002



\*Differences in age-adjusted incidence rates were statistically tested at 95% confidence levels to compare each county with the all-county rate.

Figure 15.

## Percentage of Prostate Cancer Cases Localized at Diagnosis by County



# Time Trends

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## Time Trends

Changes that occurred in cancer incidence and cancer mortality in Michigan over a ten to fifteen-year period are illustrated in this section. Data on new cancer cases from 1988 to 2002 and deaths due to cancer from 1989 to 2003 were made available from the statewide cancer registry at the Michigan Department of Community Health.<sup>1</sup> The Estimated Annual Percent Change (EAPC) in age-adjusted incidence and mortality rates over multiple-year periods were calculated by regressing the calendar year on the natural log of age-adjusted incidence and mortality rates.<sup>2,3</sup> Rates were calculated by direct age-adjustment using the 2000 US population age distribution as the standard population.<sup>4</sup> In the regression equation ( $y=mx+b$ ),  $x$ =year and  $y=\ln(\text{rate})$ . The  $EAPC=100*((e^m)-1)$ . To test EAPC for statistical significance, t tests were used to test the hypothesis that the slope of the regression line is equal to zero, using two-sided  $p=.05$ . The EAPC in mortality rates was calculated over the period 1994 to 2003 and EAPC in incidence rates was calculated over the period 1993 to 2002.

The EAPC in mortality and incidence rates for Michigan and the United States over the period 1992 to 2002 are presented for comparison.<sup>5</sup>

## Summary

Figures 1 through 3 show the EAPC in mortality rates for the total population, and for women and men for the relevant cancer sites. From 1994 to 2003, Michigan total mortality rates due to breast, cervical, colorectal, lung and prostate cancer all decreased. All changes were statistically significant at  $p\leq.05$ . Lung cancer mortality rates decreased among men, but increased among women (statistically significant changes at  $p\leq.05$ ).

Figure 4 shows EAPC in mortality rates for Michigan next to EAPC in mortality rates for the United States. Over the time period from 1992 to 2002, both Michigan and the United States had similar EAPC for breast, colorectal, lung and prostate cancer rates. The greatest difference between Michigan's and the national EAPC in mortality rates was for cervical cancer mortality; Michigan's EAPC was  $-4.4\%$ , compared to the national EAPC of  $-3.1\%$ .

Figures 5 through 7 track yearly mortality rates for each cancer site from 1989 to 2003. The mortality rates followed over time are presented for the total population and by gender.

<sup>1</sup> Michigan Resident Cancer Incidence File including cases processed by November 16, 2004 and Michigan Resident Death Files, Michigan Department of Community Health (MDCH), Division for Vital Records and Health Statistics.

<sup>2</sup> Annual state population estimates based on the actual size of the Michigan population in years 1985 through 2003 were used in calculating rates. Population data provided by the Department of Management and Budget, received February 15, 2005.

<sup>3</sup> Edwards BK, Brown ML, Wingo PA, Howe HL, Ward I, Ries LAG, Schrag D, Jamison PM, Jemal A, Wu XC, Friedman C, Harlan L, Warren J, Anderson RN, Pickle LW. Annual Report to the Nation on the Status of Cancer, 1975-2002, Featuring Population-Based Trends in Cancer Treatment. *Journal of the National Cancer Institute*. October 5, 2005; 97:19, 1407-27.

<sup>4</sup> Michigan Department of Community Health (MDCH), Division for Vital Records and Health Statistics.

<sup>5</sup> Ries LAG, Eisner MP, Kosary CL, Hankey BF, Miller BA, Clegg L, Mariotto A, Feuer EJ, Edwards BK (eds). *SEER Cancer Statistics Review, 1975-2002*, National Cancer Institute. Bethesda, MD, [http://seer.cancer.gov/csr/1975\\_2002/](http://seer.cancer.gov/csr/1975_2002/), based on November 2004 SEER data submission, posted to the SEER web site 2005.

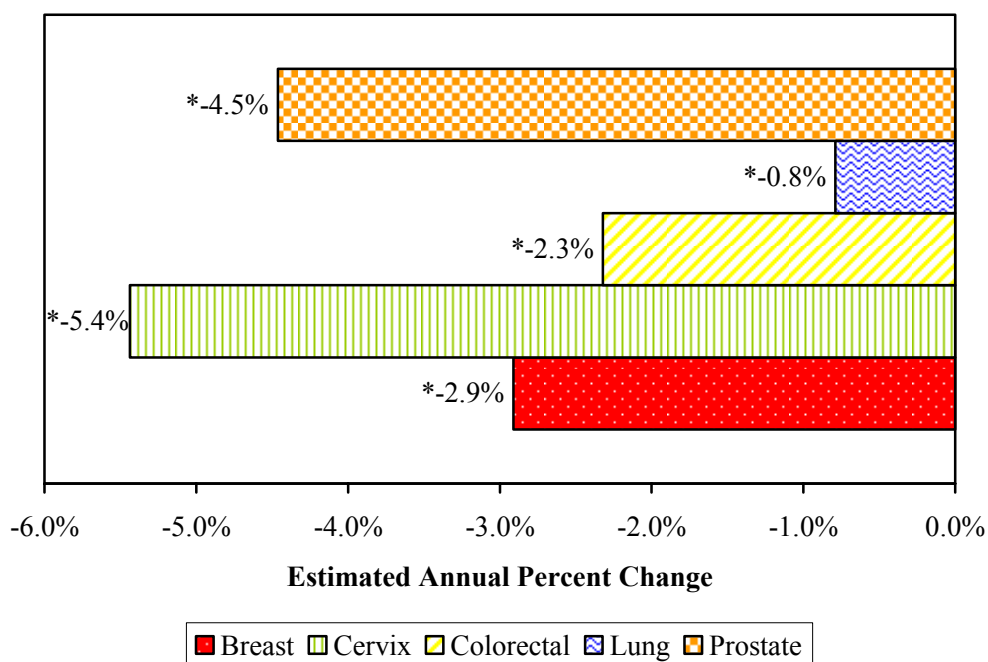
Figures 8 through 10 show the EAPC in incidence rates for the total population, women only and men only for the relevant cancer sites. In the period from 1993 to 2002, cervical, colorectal, lung and prostate cancer incidence rates in Michigan all decreased; the decrease in the rates for cervical, colorectal, and lung cancer sites were statistically significant at  $p \leq .05$ . Lung cancer incidence among men decreased, while the incidence rate among women increased by 0.4% per year; changes in EAPC among males were statistically significant at  $p \leq .05$ .

Figure 11 shows EAPC in incidence rates for Michigan and EAPC in incidence rates for the United States. From 1992 to 2002, the greatest difference in EAPC was in cervical cancer incidence and Michigan's EAPC was more negative than the EAPC for the United States. The EAPC in colorectal, lung and prostate cancer incidence rates were similar in Michigan and nationally. For breast cancer incidence; Michigan's EAPC showed a slight decrease, while nationally the EAPC was 0.4% (although neither EAPC was statistically significant).

Figures 12 through 14 follow the yearly incidence rates by cancer site from 1988 to 2002 for the total population, and women and men separately.

Figure 1.

## Estimated Annual Percent Change in Mortality Rates by Cancer Site, Michigan 1994-2003

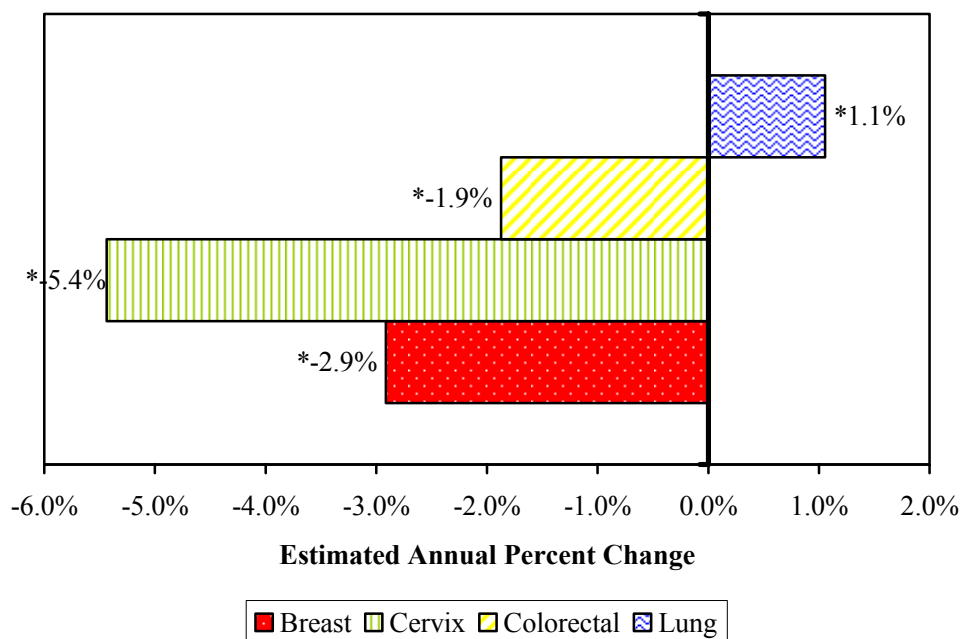


\* The EAPC is significantly different from zero ( $p \leq .05$ ).

Rates are age-adjusted and computed by gender for breast, cervical and prostate cancer.

Figure 2.

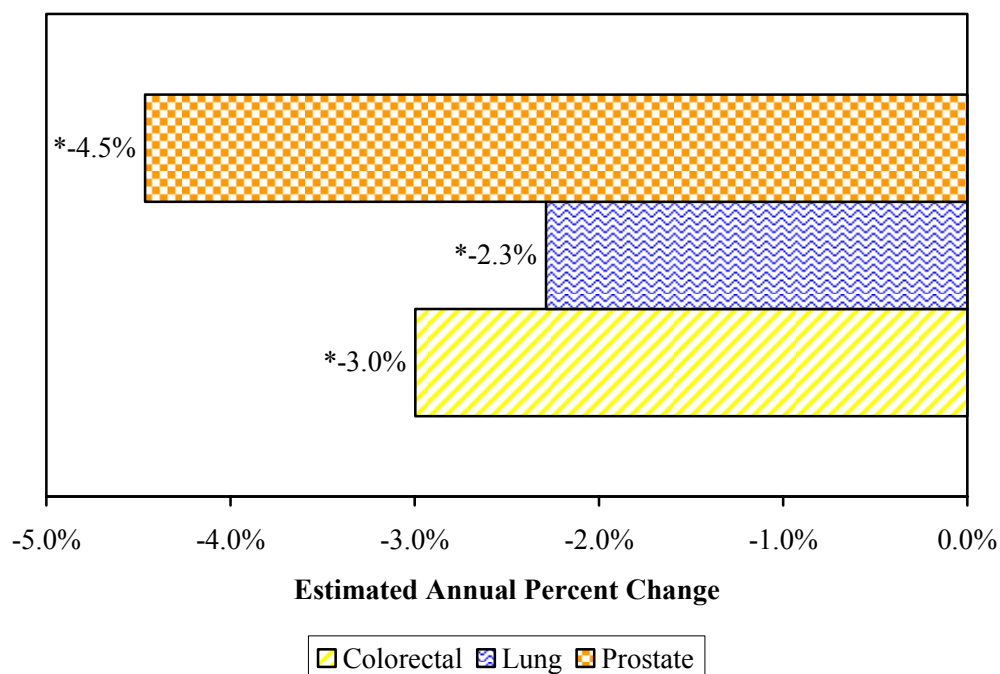
## Estimated Annual Percent Change in Mortality Rates by Cancer Site, Michigan Females 1994-2003



\* The EAPC is significantly different from zero ( $p \leq 0.05$ ).  
Rates are age-adjusted and computed by gender.

Figure 3.

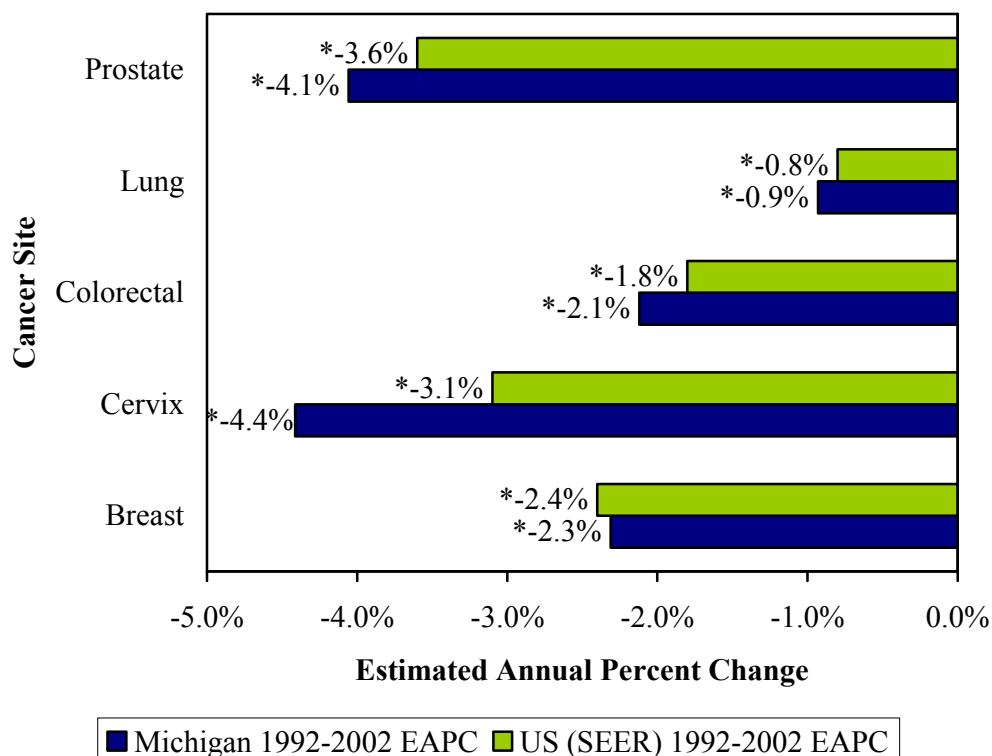
### Estimated Annual Percent Change in Mortality Rates by Cancer Site, Michigan Males 1994-2003



\* The EAPC is significantly different from zero ( $p \leq 0.05$ ).  
Rates are age-adjusted and computed by gender.

Figure 4.

## Estimated Annual Percent Change in Mortality Rates, Michigan vs. US 1992-2002

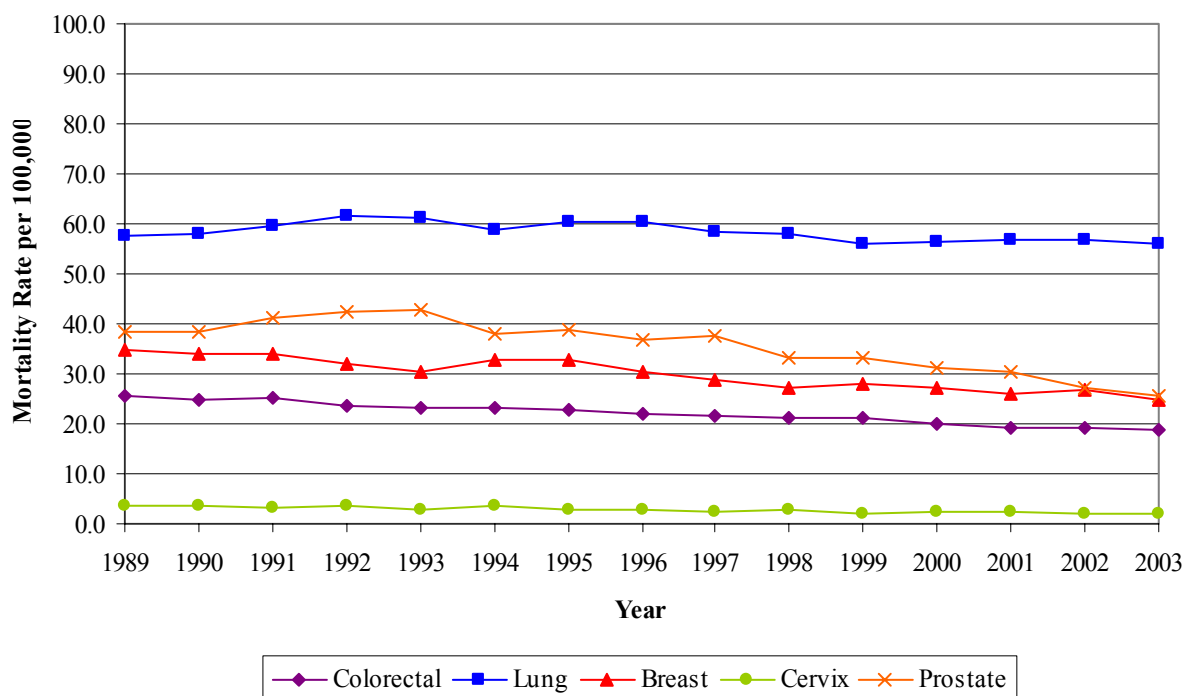


\* The EAPC is significantly different from zero ( $p \leq 0.05$ ).

Rates are age-adjusted and computed by gender breast, cervical and prostate cancer.

Figure 5.

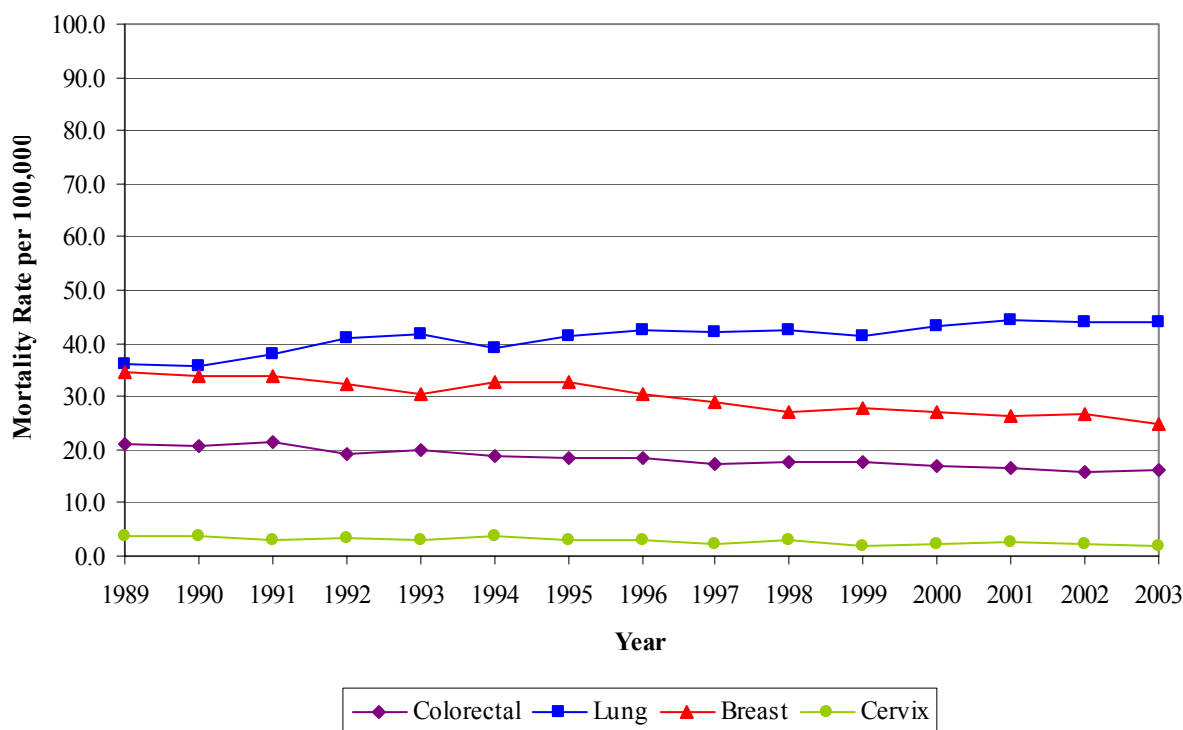
## Total Mortality Rates by Cancer Site, Michigan 1989-2003



Rates are age-adjusted per 100,000 population and computed by gender for breast, cervical and prostate cancer.

Figure 6.

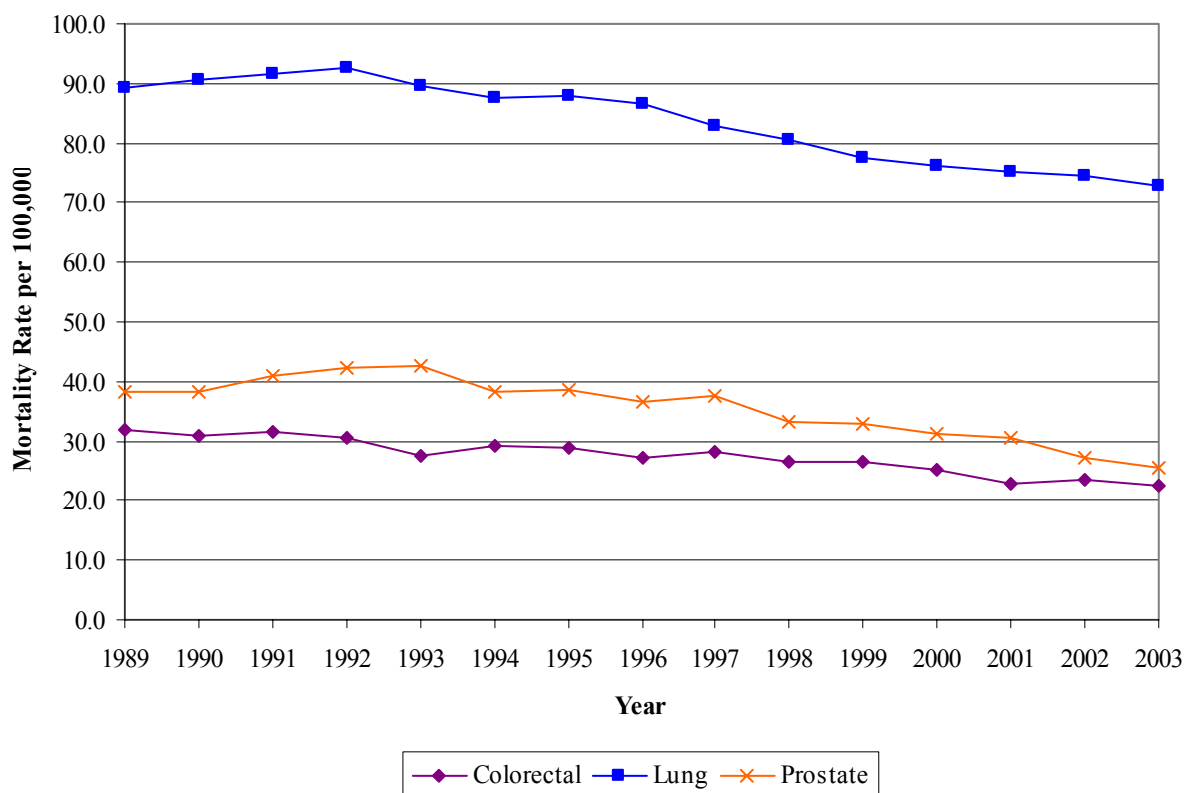
## Female Mortality Rates by Cancer Site, Michigan 1989-2003



Rates are age-adjusted per 100,000 gender-specific population.

Figure 7.

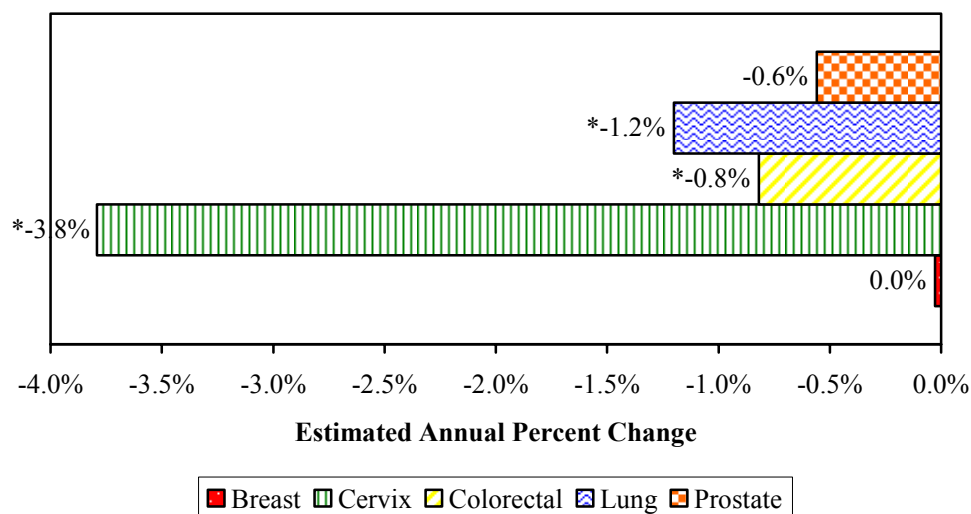
## Male Mortality Rates by Cancer Site, Michigan 1989-2003



Rates are age-adjusted per 100,000 gender-specific population.

Figure 8.

## Estimated Annual Percent Change in Incidence Rates by Cancer Site, Michigan 1993-2002

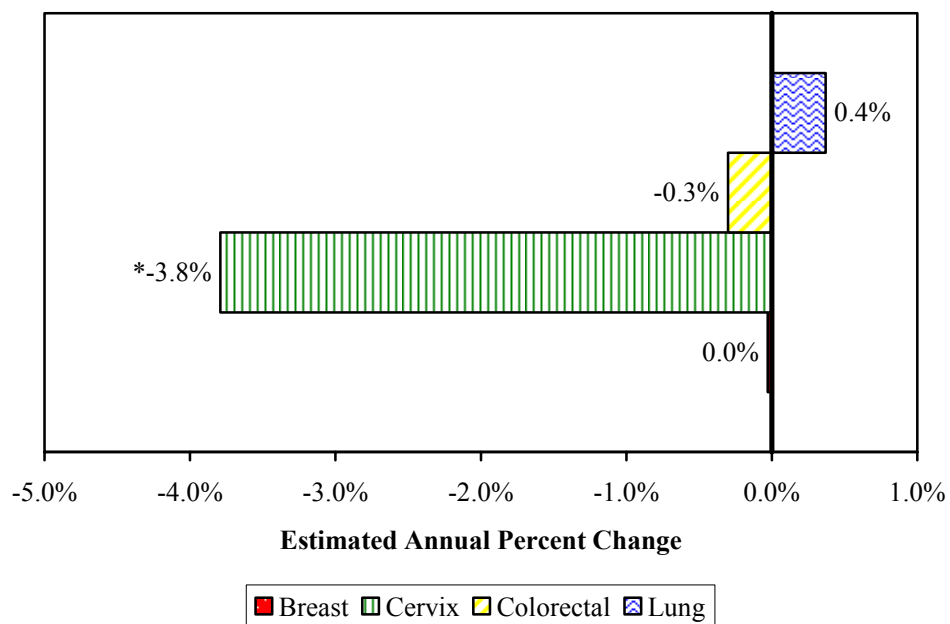


\* The EAPC is significantly different from zero ( $p \leq .05$ ).

Rates are age-adjusted and computed by gender for breast, cervical and prostate cancer.

Figure 9.

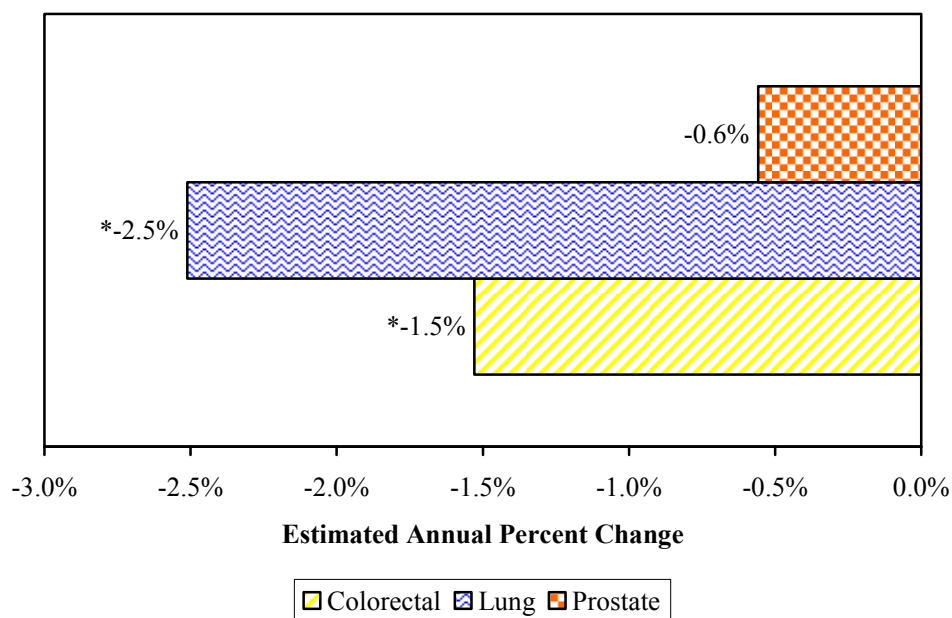
## Estimated Annual Percent Change in Incidence Rates by Cancer Site, Michigan Females 1993-2002



\* The EAPC is significantly different from zero ( $p \leq 0.05$ ).  
Rates are age-adjusted and computed by gender.

Figure 10.

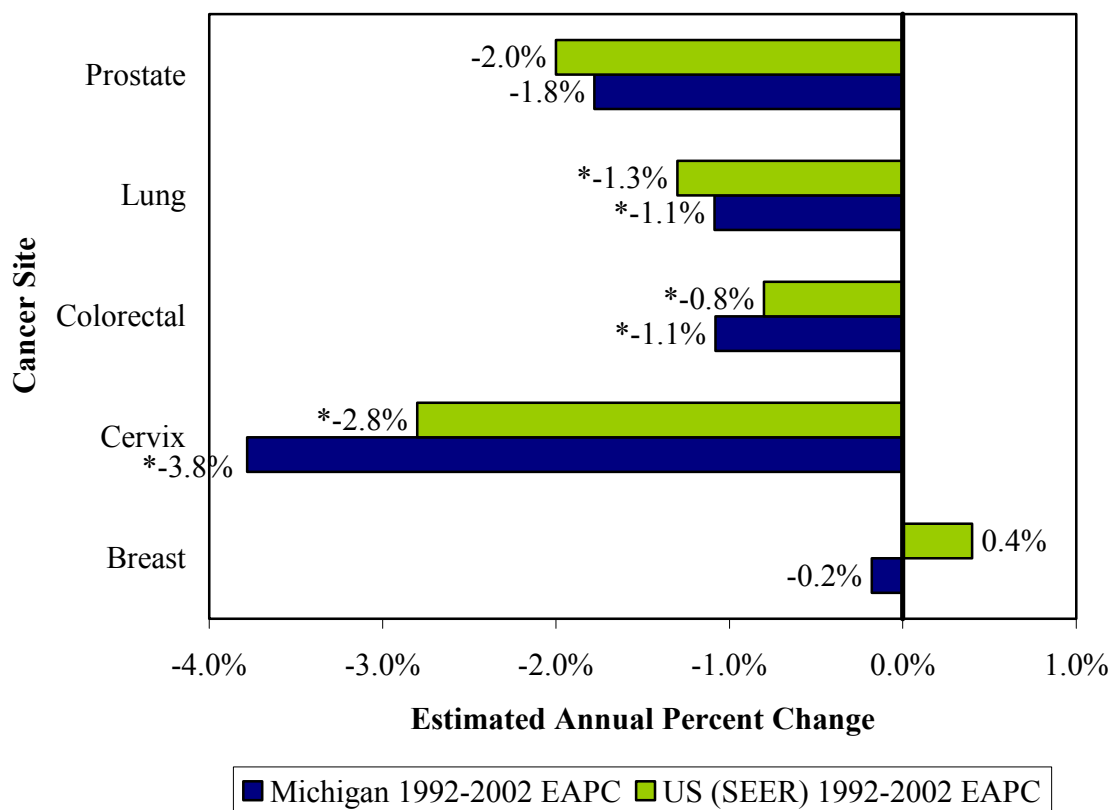
## Estimated Annual Percent Change in Incidence Rates by Cancer Site, Michigan Males 1993-2002



\* The EAPC is significantly different from zero ( $p \leq .05$ ).  
Rates are age-adjusted and computed by gender.

Figure 11.

## Estimated Annual Percent Change in Incidence Rates, Michigan vs. US 1992-2002

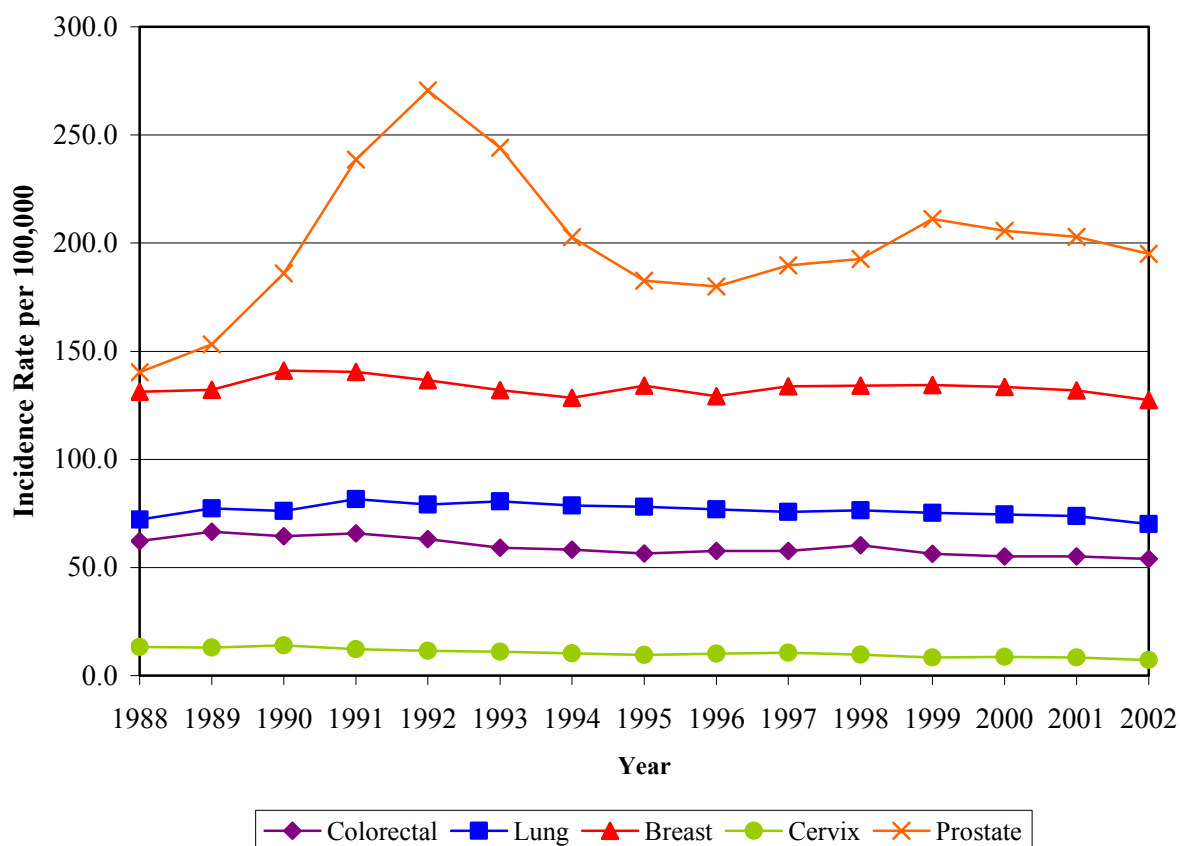


\* The EAPC is significantly different from zero ( $p \leq 0.05$ ).

Rates are age-adjusted and computed by gender for breast, cervical and prostate cancer.

Figure 12.

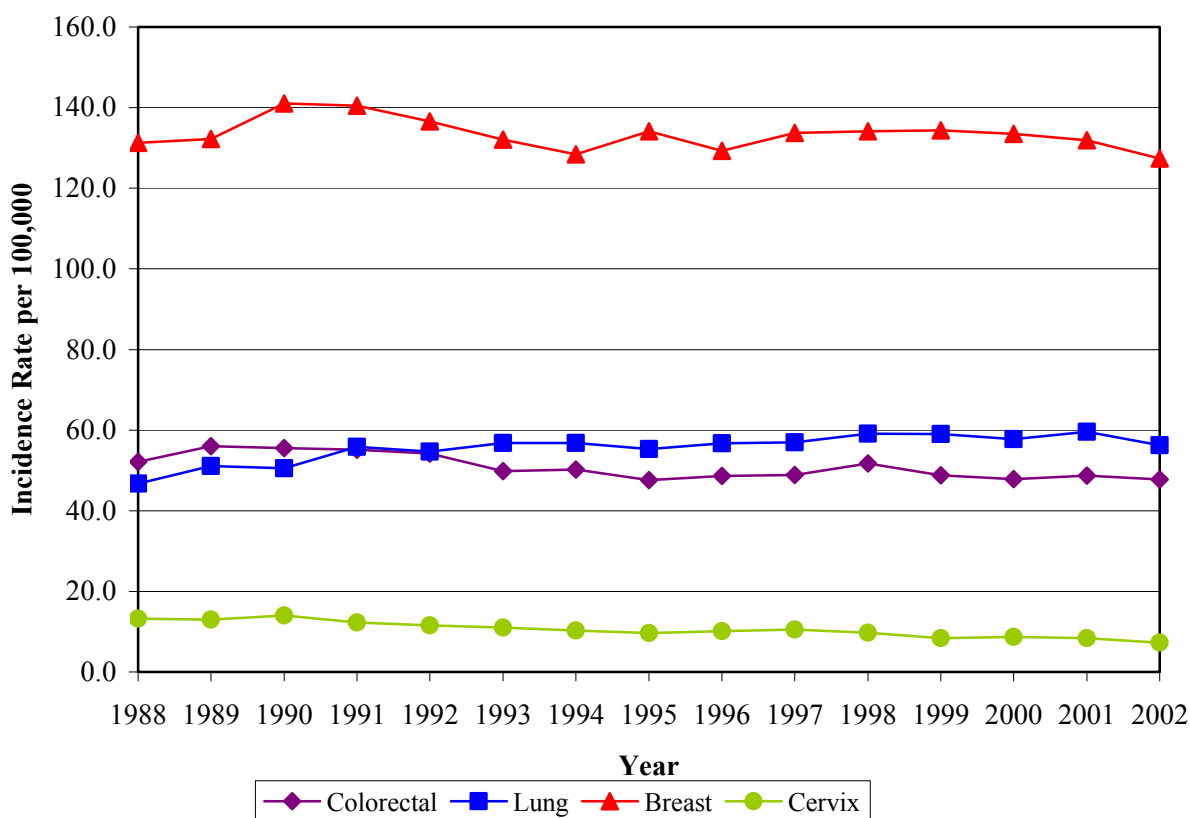
## Total Incidence Rates by Cancer Site, Michigan 1988-2002



Rates are age-adjusted per 100,000 population and computed by gender for breast, cervical and prostate cancer.

Figure 13.

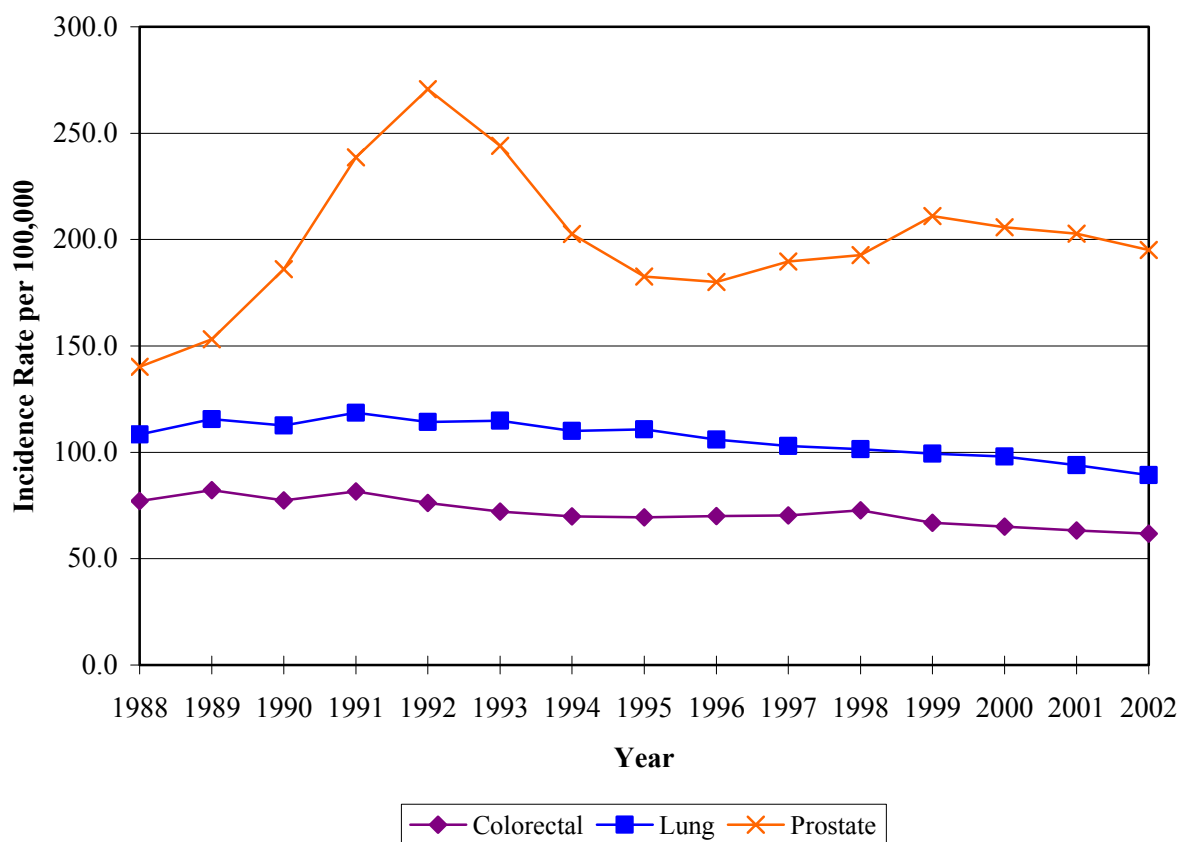
## Female Incidence Rates by Cancer Site, Michigan 1988-2002



Rates are age-adjusted per 100,000 gender-specific population.

Figure 14.

## Male Incidence Rates by Cancer Site, Michigan 1988-2002



Rates are age-adjusted per 100,000 gender-specific population.

# Cancer-related Behavioral Risk Factors

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## Background of Cancer-related Behavioral Risk Factors

Certain behaviors such as individual cancer screening practices and lifestyle choices are relevant to the incidence, morbidity and mortality of breast, cervical, colorectal, lung and prostate cancers. Data collected on such behaviors are presented in this section of the report.

Behavior data for Michigan residents were obtained from the Michigan Department of Community Health's Behavioral Risk Factor Surveillance System (BRFSS), the Michigan State Board of Education's Michigan Youth Risk Behavior Survey (YRBS), and the Special Cancer Behavioral Risk Factor Survey (SCBRFS), from the Michigan Department of Community Health and the Michigan Public Health Institute.

### Michigan Behavioral Risk Factor Survey, Youth Risk Behavior Survey, and Special Cancer Behavioral Risk Factor Survey

The Michigan Behavioral Risk Factor Surveillance System (MI BRFSS) is an ongoing state-level telephone survey that the Michigan Department of Community Health regularly conducts in cooperation with the Centers for Disease Control and Prevention (CDC). Each month a random sample of approximately 200 Michigan adults 18 years or older is interviewed. Survey instruments are designed so that a core set of questions dealing with some of the main risk indicators are asked each year while additional questions about areas of importance are rotated in and out of the protocol. This design allows for more precise estimates of major risk or health promotion behaviors as well as allowing for a broad range of questions to be included. Michigan BRFSS data used in this report were collected in the years of 1990 through 2004.<sup>1</sup> Michigan BRFSS reports are available to the public on the Michigan Department of Community Health's website at [http://www.michigan.gov/mdch/1,1607,7-132-2944\\_5327-12702--,00.html](http://www.michigan.gov/mdch/1,1607,7-132-2944_5327-12702--,00.html). In this report, MI BRFSS data are included to illustrate trends in prevalence rates over time for various behaviors relevant to cancer prevention or detection. Current rates of cervical cancer screening from the MI BRFSS are also presented.

Tables and figures of prevalence rates for risk behaviors among Michigan youth that are included in this section present data from the Youth Risk Behavior Surveillance System (YRBSS). The YRBSS was developed by the CDC to track the prevalence of health-risk behaviors among the nation's youth. The Youth Risk Behavior Survey (YRBS) has been conducted every other year by state and local education agencies across the United States since the spring of 1990 to assess the prevalence of six categories of health risk behaviors among youth grades nine through twelve. Michigan has administered this survey to students at randomly selected public schools across the state. Questions include many areas of risk behaviors from seatbelt use to illicit drug, alcohol and cigarette use, as well as questions about sexual behavior and other topics. Tobacco use and sexual activity data from the 2003 Michigan YRBS are included in this report.<sup>2</sup>

<sup>1</sup> Behavioral Risk Factor Surveillance Survey (1990-2002). Michigan Department of Community Health, *Health Risk Behaviors, 1990-2003* and 2004 Michigan Behavioral Risk Factor Surveillance System Preliminary Results.

<sup>2</sup> Youth Risk Behavior Survey (2003). Centers for Disease Control and Prevention, Available: <http://www.cdc.gov/nccdphp/dash/yrbs/> [updated September 30, 2004].

All other data on current prevalence rates of cancer-related risk behaviors presented in this report are from the 2004 Special Cancer Behavioral Risk Factor Survey (SCBRFS). The SCBRFS was initiated to evaluate cancer screening practices and cancer-related issues in Michigan; specifically. The 2001-2002 SCBRFS was intended to provide baseline data needed to evaluate projects and programs carried out through the collaborative efforts of the Michigan Cancer Consortium (MCC). The SCBRFS was repeated in 2004 with a majority of the same questions. The 2004 SCBRFS provides population-based estimates of the prevalence of certain health-related behaviors that are relevant to cancer prevention or detection among Michigan residents. The 2004 data can be used to compare results against the 2001-2002 survey to assess progress at improving health-related behaviors and cancer screening in Michigan. The target population for the 2004 SCBRFS was men and women in Michigan 40 years of age or older. This age group has the highest incidence and mortality rates for the cancer sites targeted by the Michigan Cancer Consortium Initiative (MCCI) (breast, cervical, colorectal, lung and prostate cancer), and this is the age group for whom regular cancer screening is most recommended. Using telephone surveillance methodology, interviews were conducted with a sample of Michigan residents from the entire state. The sampling design over-sampled for African Americans and included targeted samples of American Indians, Hispanics, Arab Americans, and Asian Americans in order to reach enough members of each special population to allow for risk behavior rate comparisons among these special populations and the general population in Michigan. A total of 4,196 interviews were completed between May 2004 and January 2005.

## Summary

### Breast cancer screening

The Michigan Cancer Consortium (MCC), the Michigan Department of Community Health (MDCH) and the American Cancer Society (ACS) recommend that women over the age of 40 years have a mammogram and clinical breast exam (CBE) every year.<sup>3</sup>

Among Michigan women aged 40 years or older, 55.3% had appropriate screening according to these guidelines in 2004 (Figure 1). Among the special populations surveyed, Arab American women had the lowest prevalence of appropriate screening (43.2%); the prevalence among African American women (51.8%) was also lower than that of the general population.

Since 1991 the prevalence of women aged 40 years or older who were appropriately screened for breast cancer has increased slightly, from 49.5% in 1991 to 55.7% in 2004 (Figure 2).

### Cervical cancer screening and sexual behaviors

Current MCC and MDCH cervical cancer screening recommendations are that all women should begin Pap tests starting at age 21 or at the age when sexual activity begins.<sup>4</sup> Sexual activity includes any activity that puts a woman at risk for human papilloma virus (HPV), because infections with certain strains of HPV are the most important risk factor for cervical cancer.<sup>5</sup>

The MCC and MDCH recommend Pap tests be done at least once every three years. In 2004, 82.6% of women aged 18 years or older were screened appropriately according to these guidelines (Figure 3). However, the prevalence of appropriate cervical cancer screening peaked among 50-59 year olds and declined as age increased thereafter.

Among all women aged 18 years or older, the prevalence of appropriate cervical cancer screening did not change noticeably between 1992 and 2004 (Figure 4).

The prevalence of sexual behaviors among Michigan youth is presented in Table 1. Forty-four percent (44.0%) of ninth to twelfth grade students had ever had sexual intercourse. Of these students, 37.0% had not used a condom during their last sexual intercourse and 14.0% had sexual intercourse with four or more people during their lives. Sexual behaviors among Michigan youth do not differ significantly to that of the nation (Figure 5).

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<sup>3</sup> Michigan Cancer Consortium (MCC) Recommendations for Breast Cancer Screening, November 17, 2004 [Online]. Available at: <http://www.michigancancer.org/PDFs/EarlyDetectionRecs/MCCBreastCaGuidelines-111704.pdf>.

<sup>4</sup> Michigan Cancer Consortium (MCC) Recommendations for the Early Diagnosis of Cervical Cancer, 2003 [Online]. Available at: <http://www.michigancancer.org/PDFs/EarlyDetectionRecs/MCCCervCAGuidelines-041703.pdf>.

<sup>5</sup> American Cancer Society (ACS) [Online]. Available at: [http://www.cancer.org/docroot/CRI/content/CRI\\_2\\_4\\_2X\\_Do\\_we\\_know\\_what\\_causes\\_cervical\\_cancer\\_8.asp?sitearea](http://www.cancer.org/docroot/CRI/content/CRI_2_4_2X_Do_we_know_what_causes_cervical_cancer_8.asp?sitearea).

### Colorectal cancer screening

Recommendations by the MCC and MDCH for colorectal cancer screening include five screening schedule options for a person at average risk for colorectal cancer.<sup>6</sup> According to these guidelines, all persons at average risk should be screened for colorectal cancer starting at age 50. Appropriate screening may consist of an annual fecal occult blood test (FOBT), a sigmoidoscopy exam once every five years, a sigmoidoscopy exam once every five years with an annual FOBT, a double contrast barium enema (DCBE) once every five years, or a colonoscopy once every ten years.

In 2004, 52.7% of adults aged 50 years or older had one of the recommended colorectal cancer screening tests within the appropriate timeframe (Figure 6). Of the individual tests: 8.7% of adults aged 50 years or older had an annual FOBT and sigmoidoscopy within 5 years; 34.9% of adults aged 50 years or older had a colonoscopy within 10 years; 18.2% of adults aged 50 years or older had a DCBE within 5 years; 27.0% of adults aged 50 years or older had an annual FOBT; 21.2% of adults aged 50 years or older had a sigmoidoscopy within 5 years.

Among the special population groups surveyed, the prevalence of screening according to appropriate timeframes was generally lowest among Hispanics and Asian Americans (Table 2).

Over time, the prevalence of FOBT and having had a lower gastrointestinal endoscopic exam increased slightly (Figures 7, 8 and 9).

### Lung cancer prevention

Although cigarette smoking is a risk factor for other types of cancer, it is the single most important risk factor in the development of lung cancer. According to the ACS, more than 87% of all lung cancers are attributed to smoking, and additional cases are attributed to environmental exposure to tobacco smoke.<sup>7</sup>

In 2004, 19.7% of the population aged 40 years or older was a current smoker (Figure 10). Of the special populations surveyed, the American Indian and Arab American populations had the highest current smoking rates; among American Indians aged 40 years or older 34.7% were current smokers and among Arab Americans in this age group, 28.2% were current smokers.

Over time, the prevalence of current smoking among adults aged 18 years or older has declined slightly since 1990 (Figure 11). Among this age group, 23.4% were current smokers in 2004.

In 2004, 49.0% of current smokers aged 40 years or older attempted to quit in the previous 12 months (Figure 12). The rates for attempting to quit were higher among some of the special populations surveyed; 50.0% of Asian Americans, 51.2% of Hispanics, 82.2% of Arab Americans, and 66.4% of African Americans had attempted to quit in the past 12 months.

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<sup>6</sup> Michigan Cancer Consortium (MCC) Recommendations for Breast Cancer Screening, February 2, 2005 [Online]. Available at: <http://www.michigancancer.org/PDFs/EarlyDetectionRecs/MCCColoCaGuidelines-Screening-020205.pdf>.

<sup>7</sup> American Cancer Society (ACS) [Online]. Available at: [http://www.cancer.org/docroot/CRI/content/CRI\\_2\\_4\\_2X\\_Do\\_we\\_know\\_what\\_causes\\_lung\\_cancer\\_26.asp?sitearea](http://www.cancer.org/docroot/CRI/content/CRI_2_4_2X_Do_we_know_what_causes_lung_cancer_26.asp?sitearea).

In 2003, 22.6% of Michigan youth (ninth grade through twelfth grade) were current smokers (Table 3). Tobacco use indicators among Michigan youth were similar to the nation; slightly more Michigan students tried to quit smoking than the U.S. average (Figure 13). The percent of current smokers among Michigan youth has decreased from 38.2% in 1997 to 22.6% in 2003 (Figure 14).

#### Prostate cancer screening

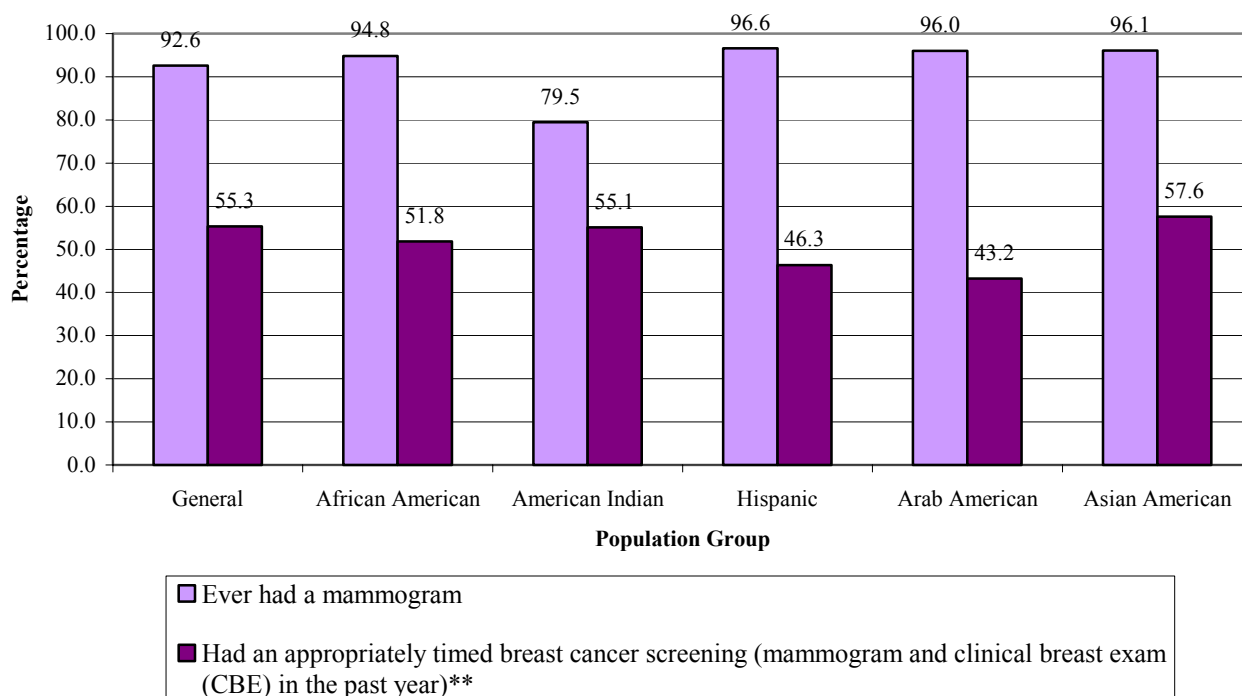
Currently the effectiveness of prostate cancer screening methods is a topic of investigation. Because prostate cancer grows very slowly, it is unknown whether treatment will help all men with prostate cancer live longer. Finding and treating prostate cancer early may help some men to live longer, but will have no impact on the life span of other men; consequent prostate cancer treatments may have an effect on a man's quality of life, causing side effects such as impotence and incontinence. The current recommendation is for men to discuss screening with their health care provider to understand their risk and advantages/disadvantages of screening as well as treatment options.

Prostate-specific antigen (PSA) testing is one method of screening for prostate cancer. During 2004, 59.3% of men aged 40 years or older had ever had a PSA test (Figure 15). Of the special populations surveyed, the percentage of men ever having had a PSA test was lower among all groups except American Indians (69.9%). Forty-nine percent (49.4%) of African Americans, 42.3% of Hispanics, 48.3% of Arab Americans, and 44.7% of Asian Americans reported ever having had a PSA test.

Figure 16 presents the percentage of Michigan men who discussed PSA testing with their doctor. Among the general population, 55.9% of men had discussed PSA testing with their doctor. Discussion of PSA testing with a doctor was least prevalent among Asian American (43.3%) and Arab American males (45.3%).

Figure 1.

## Breast Cancer Screening Among Women Aged 40 Years or Older by Population Group Michigan, 2004

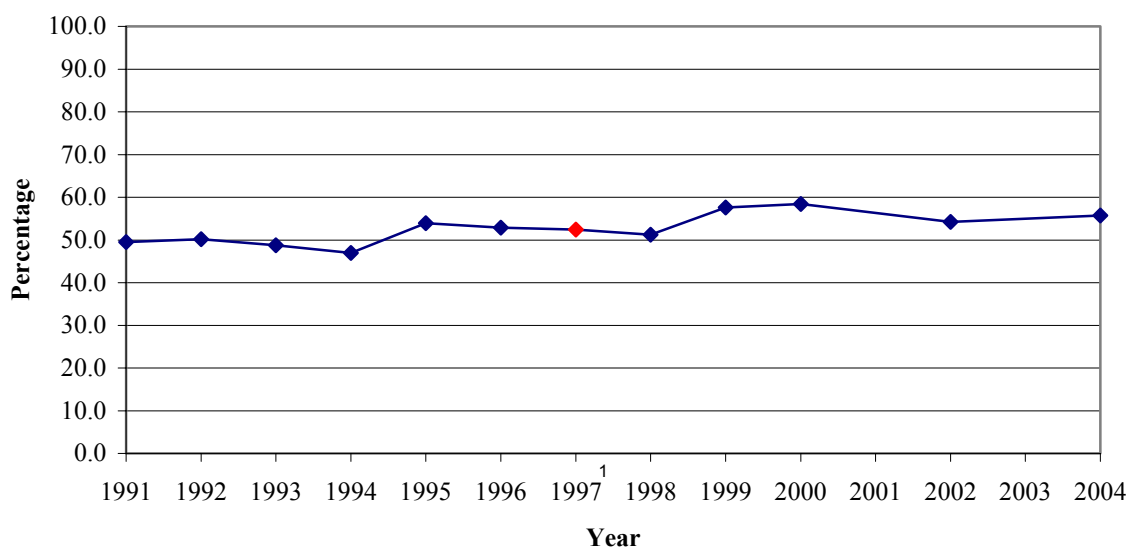


\*2004 Cancer Behavioral Risk Factor Survey

\*\*Respondents whose last breast exam was done because of a problem were not included in analysis of appropriate screening.

Figure 2.

## Comparison Across Survey Years of the Percentage of Michigan Women Aged 40 Years or Older Who Had Appropriately Timed Breast Cancer Screening



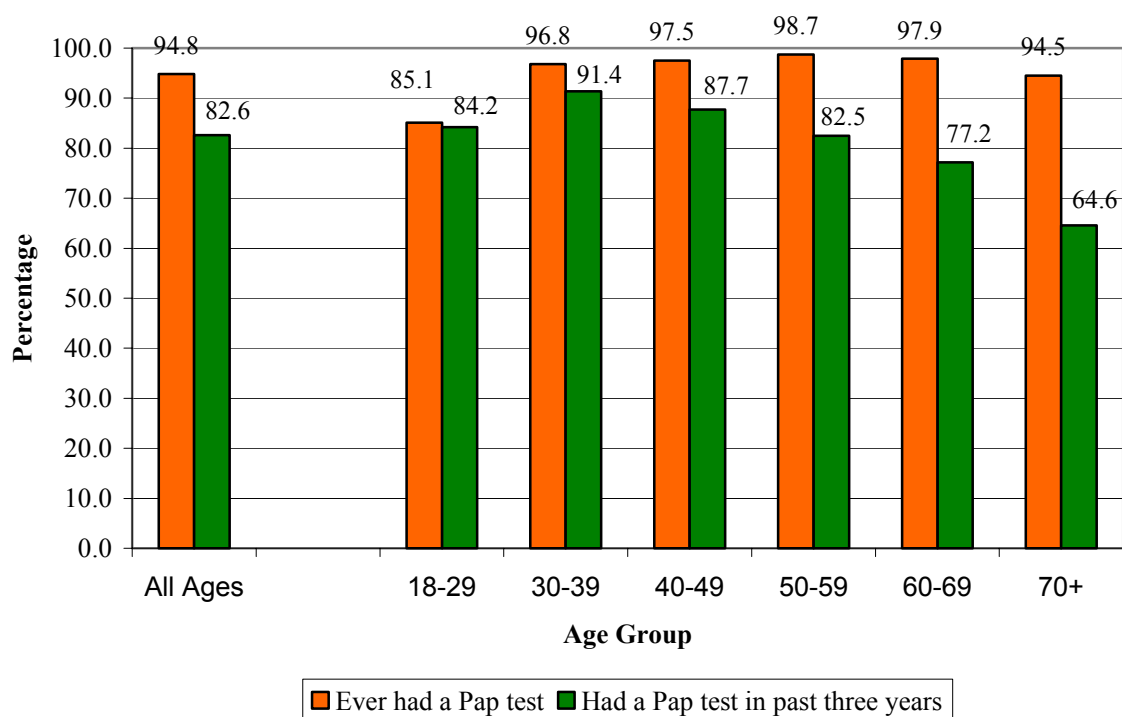
Year	Had Appropriately Timed Breast Cancer Screening <sup>1,2</sup> (%)
1991	49.5
1992	50.2
1993	48.8
1994	47.0
1995	53.9
1996	52.9
1997 <sup>1</sup>	55.4, 52.4
1998	51.2
1999	57.6
2000	58.4
2001	(Not asked)
2002	54.2
2003	(Not asked)
2004	55.7

<sup>1</sup> The ACS recommended time frame for appropriate mammography screening changed in 1997 to annually for all women 40 years of age or older. For all previous years, the recommendation was biannual screening for women aged 40 to 49 and annual screening for women aged 50+ years. As appropriate breast screening is a combination of appropriate CBE and appropriate mammography (each within the past year), this indicator changed as well.

<sup>2</sup> Respondents whose last mammogram was done because of a problem were not included in this analysis.

Figure 3.

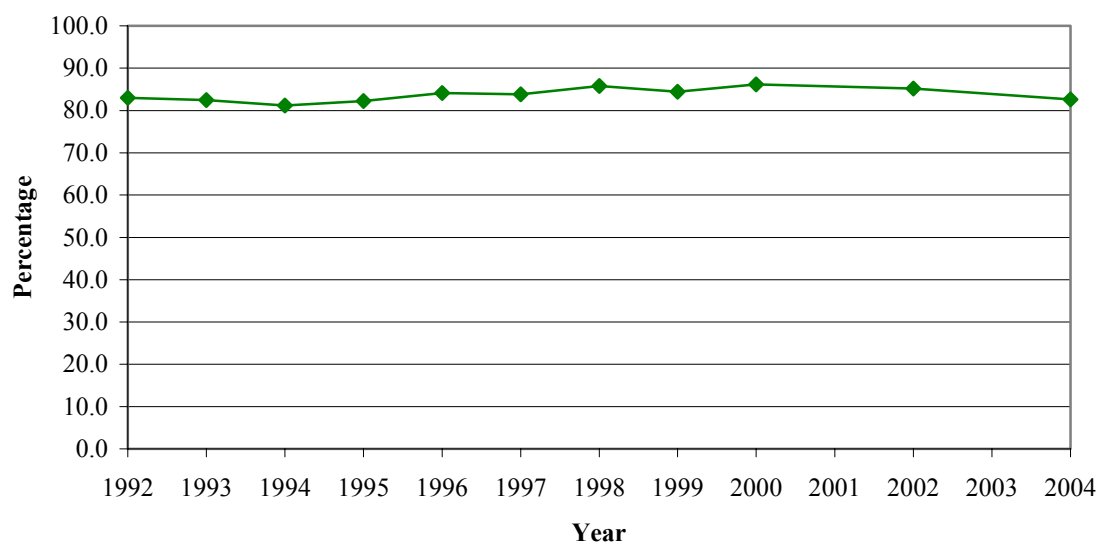
## Cervical Cancer Screening Among Michigan Women Aged 18 Years or Older by Age Group, 2004\*



\*Respondents whose last Pap test was done because of a problem were not included in this analysis.

Figure 4.

## Comparison Across Survey Years of Appropriately Timed Cervical Cancer Screening Among Michigan Women Aged 18 Years or Older



Year	Had Appropriately Timed Cervical Cancer Screening (Within Past 3 Years)* (%)
1992	83.0
1993	82.5
1994	81.2
1995	82.2
1996	84.1
1997	83.8
1998	85.8
1999	84.4
2000	86.2
2001	(Not asked)
2002	85.2
2003	(Not asked)
2004	82.6

\*Respondents whose last Pap test was done because of a problem were not included in this analysis.

Table 1.

## Sexual Intercourse Behaviors Among Michigan Youth, 2003

Behavior	MI (%)	Gender		Grades				Race		
		Male (%)	Female (%)	9 (%)	10 (%)	11 (%)	12 (%)	White (%)	Black (%)	Hispanic (%)
Percentage of students who ever had sexual intercourse	44.0	45.0	42.0	29.0	37.0	52.0	61.0	39.0	67.0	53.0
Percentage of students who had sexual intercourse for the first time before age 13	7.0	10.0	4.0	9.0	6.0	8.0	4.0	4.0	21.0	15.0
Of students who had sexual intercourse during the past three months, % who had used a condom during last sexual intercourse	63.0	69.0	57.0	74.0	60.0	64.0	59.0	61.0	72.0	--
Percentage of students who had sexual intercourse with four or more people during their lives	14.0	16.0	11.0	8.0	10.0	17.0	21.0	10.0	32.0	17.0

Figure 5.

### Sexual Behaviors Among Youth Grades 9<sup>th</sup>-12<sup>th</sup> Michigan vs. United States, 2003

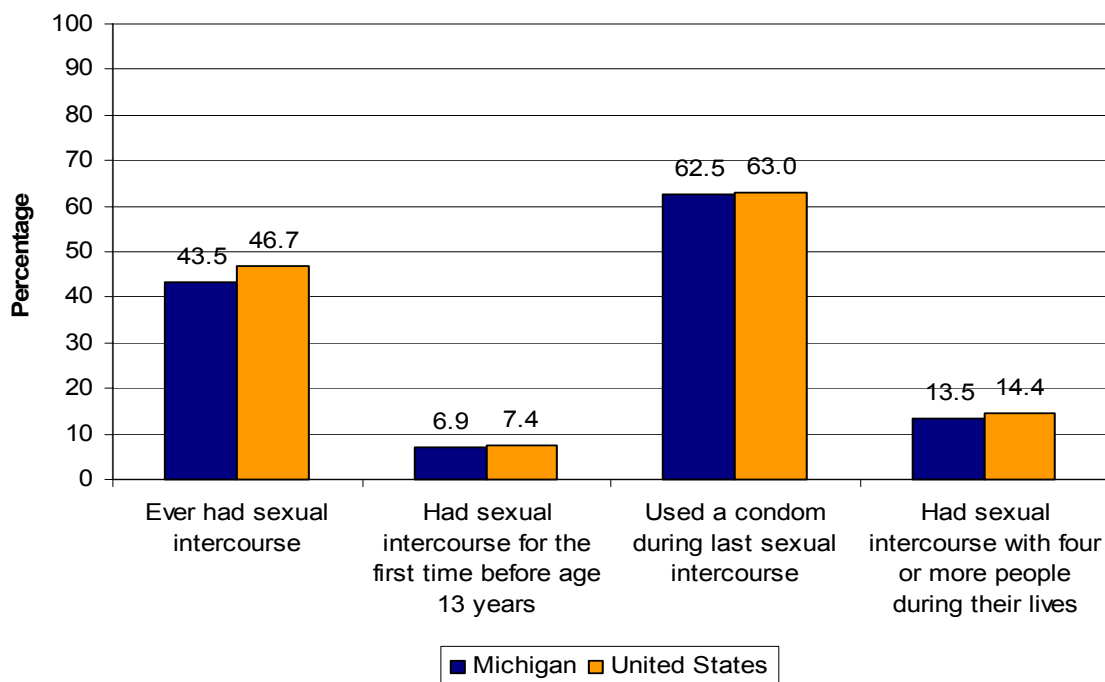
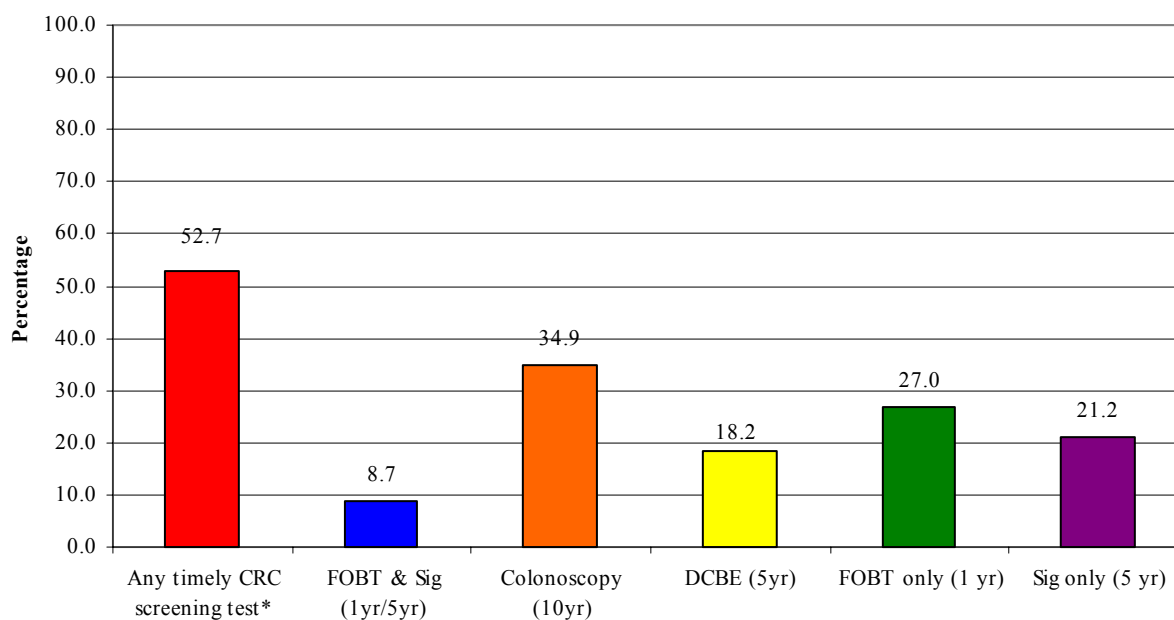


Figure 6.

## Colorectal Cancer Screening Among Michigan Residents Aged 50 Years or Older, 2004\*\*



\* Any timely CRC screening test includes a FOBT every year or a flexible sigmoidoscopy every 5 years or a FOBT every year and a flexible sigmoidoscopy every 5 years or a colonoscopy every 10 years or a DCBE every 5 years

\*\*Respondents whose last test was done because of a problem were not included in this analysis.

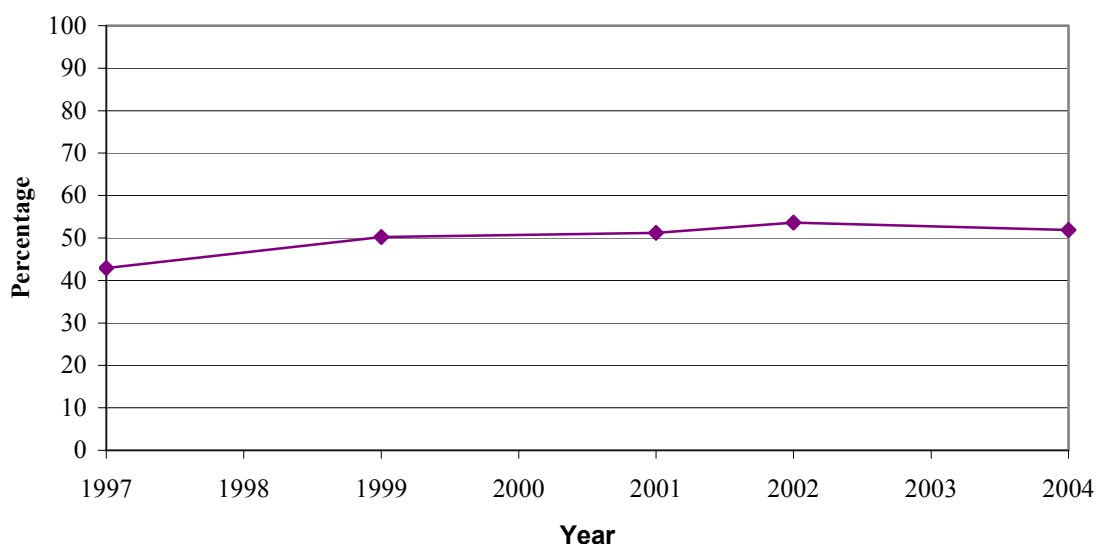
Table 2.

## Colorectal Cancer Screening Among Residents Aged 50 Years or Older by Population Group, Michigan 2004\*\*

Colorectal Cancer Screening Exam	General Population (%)	African American (%)	American Indian (%)	Hispanic (%)	Arab American (%)	Asian American (%)
Fecal Occult Blood Test (FOBT) in the past year	27.0	23.7	32.7	16.3	16.6	26.8
Sigmoidoscopy in the past five years	21.2	31.1	27.5	23.1	13.3	18.6
Sigmoidoscopy in the past five years and FOBT in the past year	8.7	10.5	11.3	7.9	8.6	9.9
Colonoscopy in the past ten years	34.9	37.7	31.9	28.9	34.8	15.4
Double Contrast Barium Enema (DCBE) in the past five years	18.2	30.6	11.8	17.8	23.9	11.6
Any timely colorectal cancer screening test*	52.7	53.4	54.6	33.0	46.3	38.6
* Any timely CRC screening test includes a FOBT every year or a flexible sigmoidoscopy every 5 years or a FOBT every year and a flexible sigmoidoscopy every 5 years or a colonoscopy every 10 years or a DCBE every 5 years **Respondents whose last test was done because of a problem were not included in this analysis.						

Figure 7.

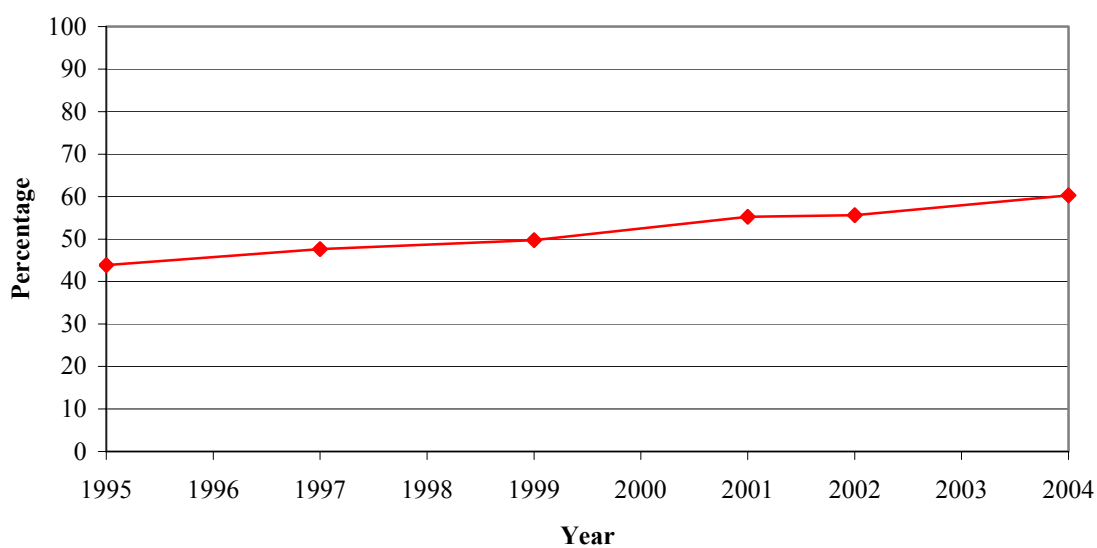
# Comparison Across Survey Years of the Percentage of Michigan Residents Aged 50 Years or Older Who Ever Had a Fecal Occult Blood Test (FOBT)



Year	Ever Had an FOBT (%)
1997	42.9
1998	(Not asked)
1999	50.2
2000	(Not asked)
2001	51.2
2002	53.6
2003	(Not asked)
2004	51.9

Figure 8.

## Comparison Across Survey Years of the Percentage of Michigan Residents Aged 50 Years or Older Who Ever Had a Lower Gastrointestinal Endoscopic Exam

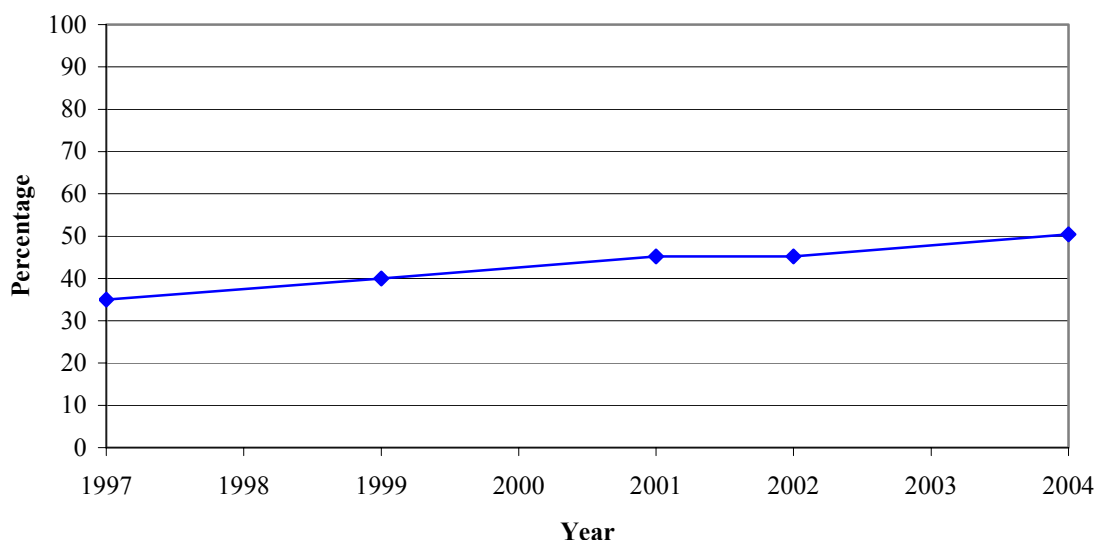


Year	Ever Had a Lower Gastrointestinal Endoscopic Exam* (%)
1995	43.9
1996	(Not asked)
1997	47.6
1998	(Not asked)
1999	49.7
2000	(Not asked)
2001	55.2
2002	55.6
2003	(Not asked)
2004	60.3

\*Questions differ slightly over time: 1997—Ever had a sigmoidoscopy or proctoscopy; 1999, 2001, 2002, 2004—Ever had a sigmoidoscopy or colonoscopy

Figure 9.

# Comparison Across Survey Years of the Percentage of Michigan Residents Aged 50 Years or Older Who Had a Lower Gastrointestinal Endoscopic Exam within the Past Five Years\*



Year	Had a Lower Gastrointestinal Endoscopic Exam Within the Past 5 Years* (%)
1997	35.0
1998	(Not asked)
1999	40.0
2000	(Not asked)
2001	45.2
2002	45.2
2003	(Not asked)
2004	50.4

\*Questions differ slightly over time: 1997—Had a sigmoidoscopy or proctoscopy within 5 years; 1999, 2001, 2002—Had a sigmoidoscopy or colonoscopy within 5 years

Figure 10.

Percentage of Adults Aged 40 Years or Older Who Are Current  
Smokers by Population Group,  
Michigan 2004

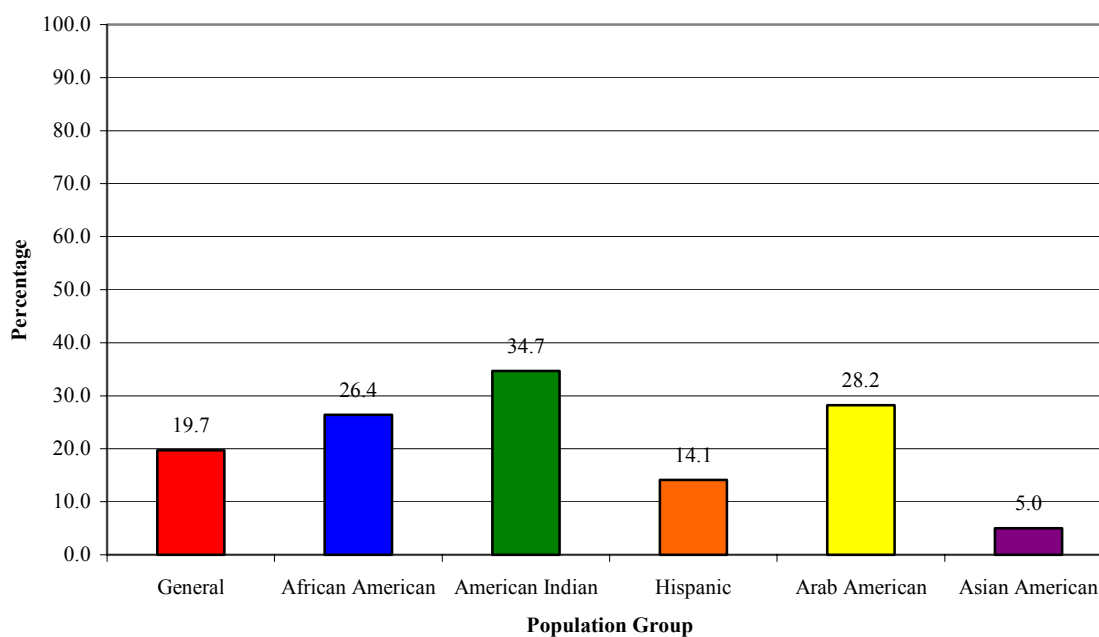
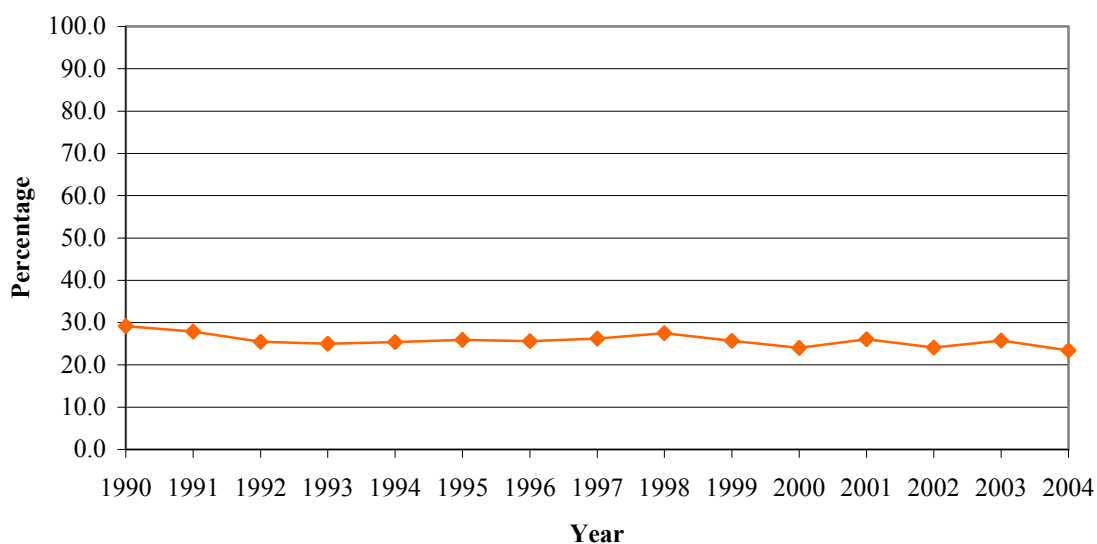


Figure 11.

## Comparison Across Survey Years of the Percentage of Michigan Residents Aged 18 or Older Who Are Current Smokers\*

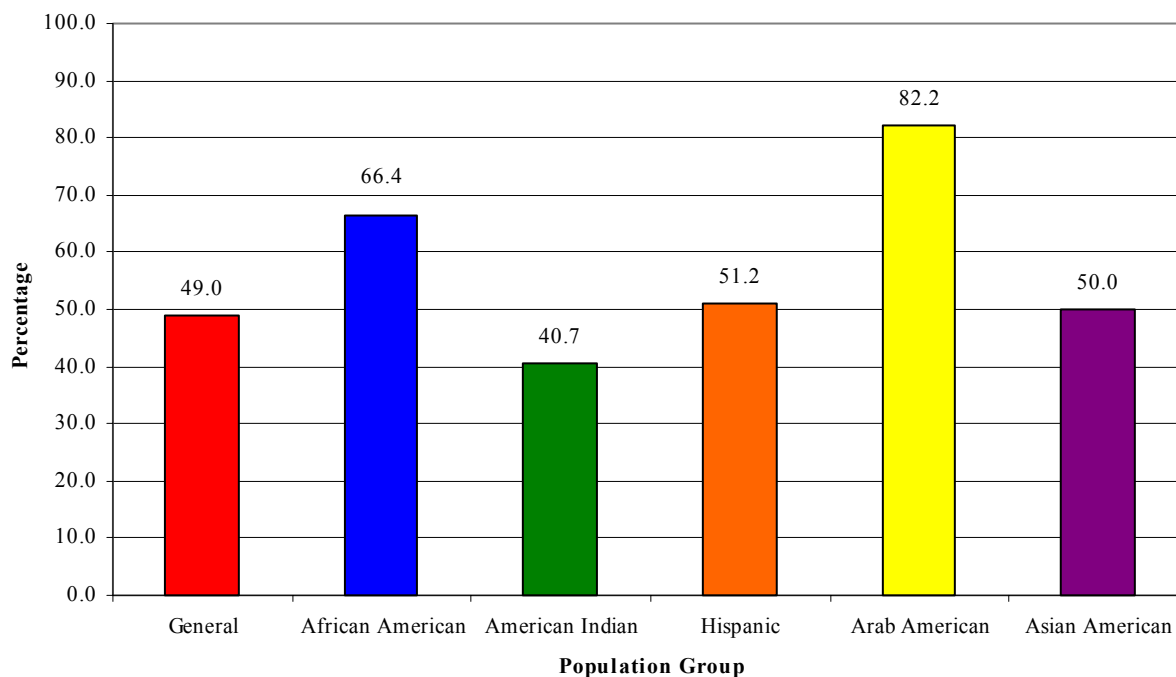


Year	Current Smokers* (%)
1990	29.2
1991	27.9
1992	25.5
1993	25
1994	25.4
1995	25.9
1996	25.6
1997	26.2
1998	27.5
1999	25.7
2000	24
2001	26.1
2002	24.1
2003	25.8
2004	23.4

\*Current smoking defined as having smoked 100 or more cigarettes in lifetime and smoke on some days now

Figure 12.

# Percentage of Current Smokers Who Attempted to Quit in the Past Twelve Months Among Michigan Residents Aged 40 Years or Older by Population Group, 2004\*



\*Current smoking defined as having smoked 100 or more cigarettes in lifetime and smoke on some days now; stopped smoking for at least one day in attempt to quit

Table 3.

## Tobacco Use Indicators Among Michigan Youth, 2003

Behavior	Total (%)	Gender		Grades				Race		
		Male (%)	Female (%)	9 (%)	10 (%)	11 (%)	12 (%)	White (%)	Black (%)	Hispanic (%)
Percentage of students who ever tried cigarettes, even 1 or 2 puffs	60.2	61.0	60.0	53.0	58.0	65.0	67.0	59.0	66.0	70.0
Percentage of students who smoked a whole cigarette before age 13	21.3	22.0	20.0	23.0	20.0	21.0	20.0	22.0	16.0	26.0
Percentage of students who smoked cigarettes on 1 or more of past 30 days	22.6	21.0	24.0	18.0	20.0	23.0	31.0	25.0	10.0	32.0
Percentage of students who smoked cigarettes on 20 or more of past 30 days	11.3	12.0	11.0	7.0	8.0	12.0	19.0	13.0	3.0	14.0
Percentage of students who smoked 2 or more cigarettes per day on days they smoked during past 30 days	15.9	16.0	16.0	12.0	13.0	17.0	24.0	18.0	5.0	18.0
Of students who were <u>current smokers</u> , percentage tried to quit smoking in the past 12 months	58.4	55.0	62.0	60.0	60.0	55.0	60.0	58.0	--	--
Percentage of students who smoked cigars, cigarillos, or little cigars on 1 or more of past 30 days	13.6	19.0	8.0	12.0	10.0	14.0	20.0	14.0	11.0	21.0
<u>Current smokers</u> 18 years and less who purchased cigarettes at a store or gas station during the past 30 days	18.0	24.0	14.0	13.0	13.0	23.0	--	17.0	--	--

Figure 13.

Tobacco Use Indicators Among Youth  
Grades 9<sup>th</sup>-12<sup>th</sup>  
Michigan vs. United States, 2003

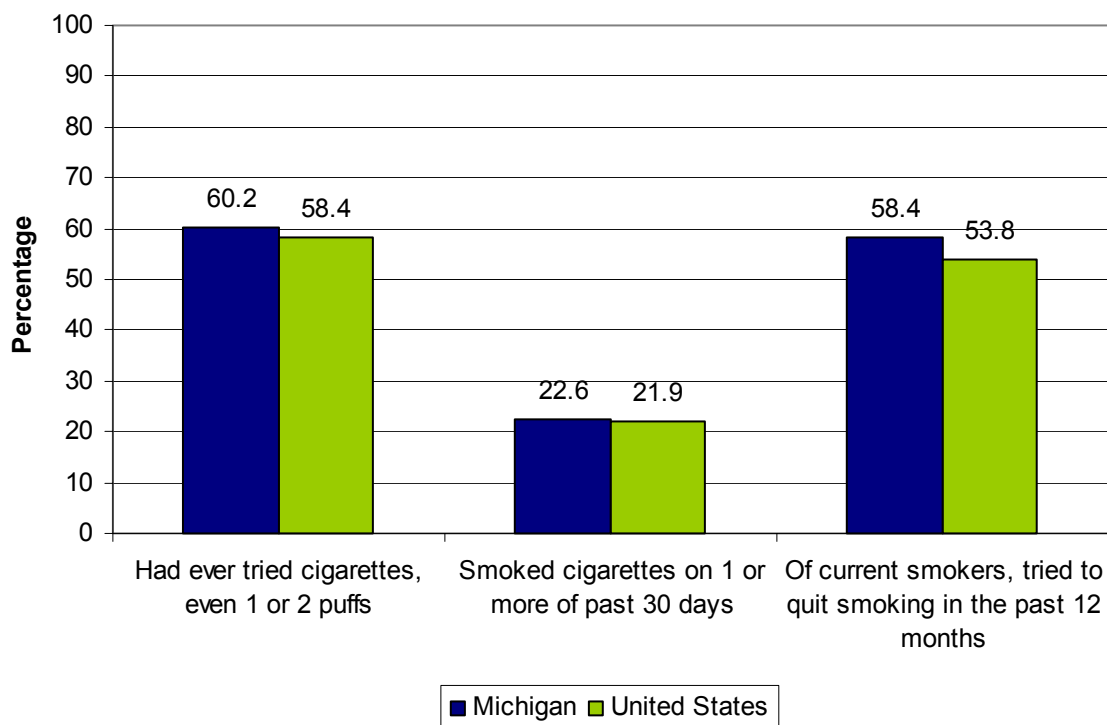
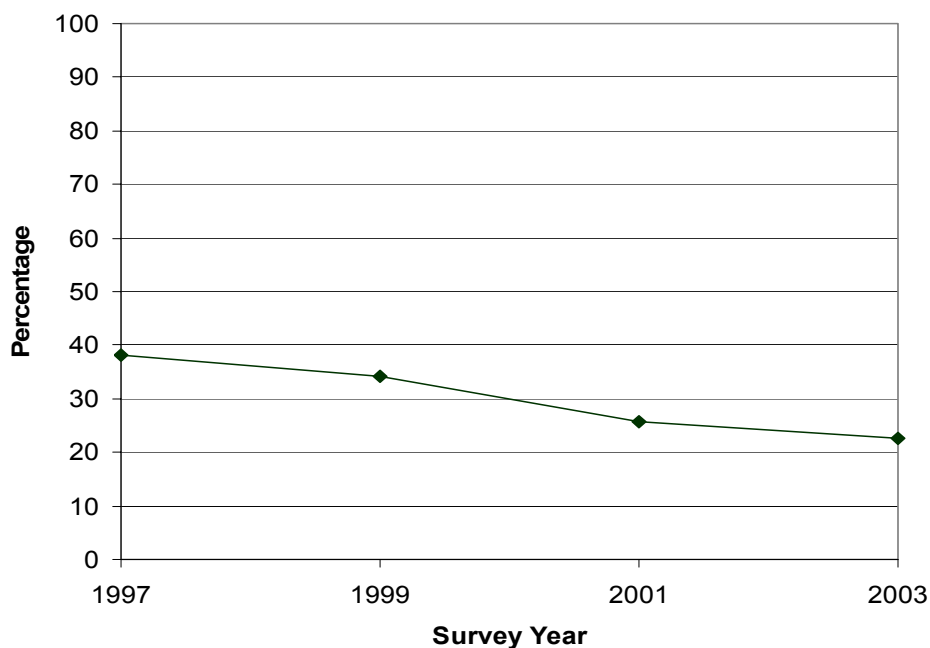


Figure 14.

## Comparison Across Survey Years of the Percentage of Michigan Youth Grades 9-12 Who Are Current Smokers



Year	Current Smokers* (%)
1997	38.2
1999	34.1
2001	25.7
2003	22.6

\*Current smoking defined as having smoked cigarettes on one or more days in the past 30 days

Figure 15.

# Percentage of Michigan Men Aged 40 Years or Older Who Ever Had a Prostate Specific Antigen (PSA) Test by Population Group, 2004

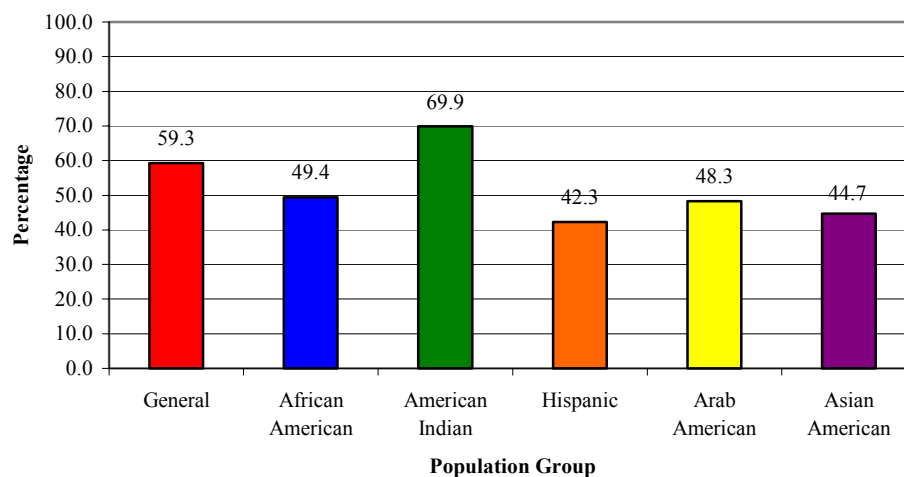
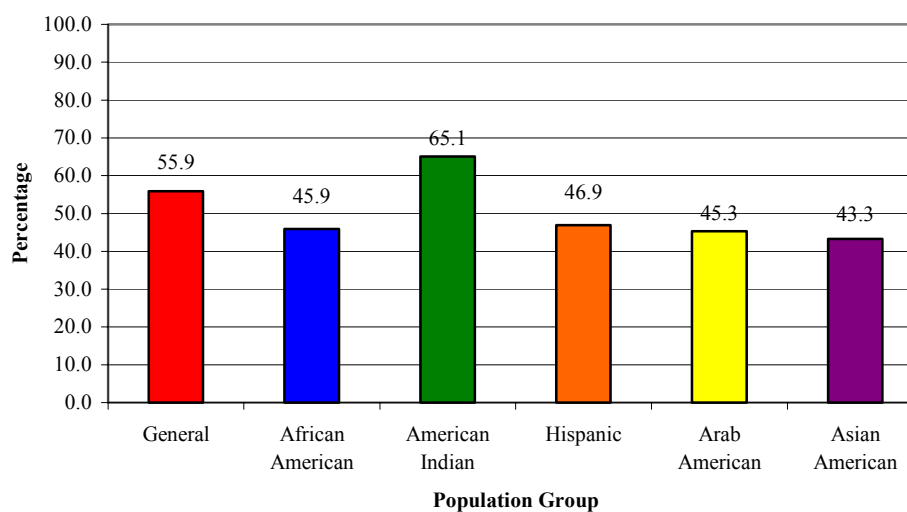


Figure 16.

# Percentage of Michigan Men Aged 40 Years or Older Who Discussed Prostate Specific Antigen (PSA) Testing with Their Doctor by Population Group, 2004



# Human Cost

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## Human Cost

Mortality and survival rates give a partial picture of the burden of cancer deaths in a population. Years of life lost (YLL) due to premature death from cancer were calculated to provide an additional dimension to the description of the burden of disease.<sup>1</sup> SEER AYLL estimates for 2001 are produced using United States Life Tables, 2001; National Vital Statistics Reports from the Centers for Disease Control and Prevention. Person-years of life lost (PYLL) were calculated for this report as follows: For each of the individuals who died of a particular cancer, it was possible to obtain the number of additional years they were expected to live, based on their gender and race, had they not died of cancer and conditional on their surviving to the age at which they died of cancer. Life expectancy data were obtained from the National Center for Health Statistics (NCHS).<sup>2</sup> One-year intervals were used in the calculations.<sup>3</sup> The number of deaths at each age was multiplied by the average years of life remaining for a person of that sex, race and age to estimate the number of years of life lost for all people of that age dying of the particular cancer.<sup>4</sup> These years of life lost were summed across ages for each of the sites to get the estimate of PYLL.<sup>1</sup>

Also presented is the average years of life lost (AYLL), calculated by dividing the PYLL by the total number of deaths.<sup>1</sup> Average years of life lost are compared between blacks and whites for each cancer site, and SEER estimates of AYLL for the United States are compared to estimates of Michigan's AYLL.

## Summary

Figure 1 shows the total number of person-years of life lost by cancer site in Michigan in 2003. The greatest number of person-years of life lost was due to lung cancer deaths; the total number of person-years lost was 88,476. Breast cancer was responsible for the next greatest number of person-years of life to be lost, costing 27,758 total person-years. This was followed by colorectal cancer, which caused 23,351 person-years of life lost. Prostate cancer cost 9,346 total years of life, and cervical cancer was responsible for 2,476 years of life lost. Figure 2 traces the total number of person-years of life lost by cancer site over time from 1989 to 2003.

Looking at the total person-years of life lost is one measure of the impact of various cancers on the population as a whole. Alternatively, the average years of life lost per death due to cancers at each of the selected sites reveals an aspect of the burden of cancer on individuals. Figure 3 shows the average years of life lost by cancer site over time from 1989 to 2003. In Figure 4, average years of life lost by Michigan residents in 2003 by cancer site are shown next to the average years of life lost nationally in 2002. Although cervical cancer caused the fewest person-

<sup>1</sup> Ries LAG, Eisner MP, Kosary CL, Hankey BF, Miller BA, Clegg L, Mariotto A, Feuer EJ, Edwards BK (eds). *SEER Cancer Statistics Review, 1975-2002*, National Cancer Institute. Bethesda, MD, [http://seer.cancer.gov/csr/1975\\_2002/](http://seer.cancer.gov/csr/1975_2002/), based on November 2004 SEER data submission, posted to the SEER web site 2005.

<sup>2</sup> United States Life Tables, 1985-2002; National Vital Statistics Reports from the Centers for Disease Control and Prevention.

<sup>3</sup> The Life Tables for years 1997-2002 show expected years of life remaining for ages zero to 100, but Life Tables for years 1985-1996 show expected years of life remaining only for ages zero to 85. In order to calculate years of life lost for people dying of cancer after age 86 in years prior to 1997, the years remaining in the 1997 Life Table for ages 86 to 100 years were used to fill in these values for the 1985-1996 calculations. Because the 2002 Life Tables are the most recent year available, they were used in calculating the person-years of life lost in 2003.

<sup>4</sup> Michigan Resident Death Files, Michigan Department of Community Health (MDCH), Division for Vital Records and Health Statistics.

years of life to be lost in the total population, of the five sites it has the greatest average number of years of life lost in Michigan, with an average of 23.8 years lost per person with this disease. There were a small number of cervical cancer deaths relative to deaths due to cancer at one of the other four sites presented in this report, so the total sum of person-years of life lost from all of the deaths is small despite the comparatively large number of years of life lost with each individual death. Breast cancer had the next highest average cost in years of life lost of the five sites, causing an average loss of 19.5 years per death. Years of life lost due to lung cancer averaged 15.6 per death, and those dying of colorectal cancer lost an average of 13.1 years of life. Prostate cancer deaths caused an average loss of 9.5 years per person with the disease.

The estimated average numbers of years of life lost due to the five selected cancer sites for Michigan in 2003 were similar to that of the SEER estimates for 2002. On average, slightly fewer years were lost due to cervical and colorectal cancers in Michigan than in the United States overall. Estimates of average years of life lost due to breast, lung, and prostate cancers were higher for Michigan than the United States averages.

In Figure 5, average years of life lost due to cancer at each of the five sites is shown by race. Averaging years of life lost per death, blacks lost more years of life than whites from breast cancer (21.0 and 18.8 years per person), colorectal cancer (15.7 and 13.5 years per person), lung cancer (15.9 and 15.3 years per person), prostate cancer (9.9 and 9.2 years per person), and cervical cancer (24.4 and 22.9 years per person).

Other than years of life lost, estimates of the human costs of cancer are scant. Morbidity indicators for the cancer patient such as losses of work or school time, and periods of restricted activity due to the disease are difficult to measure. In addition, there are significant human and financial costs to family members and other caregivers who give up activities, opportunities, and income to provide assistance to cancer patients. To date, no such data have been identified for the cancers of interest here.

Figure 1.

## Total Person-Years of Life Lost due to Cancer by Cancer Site, Michigan 2003

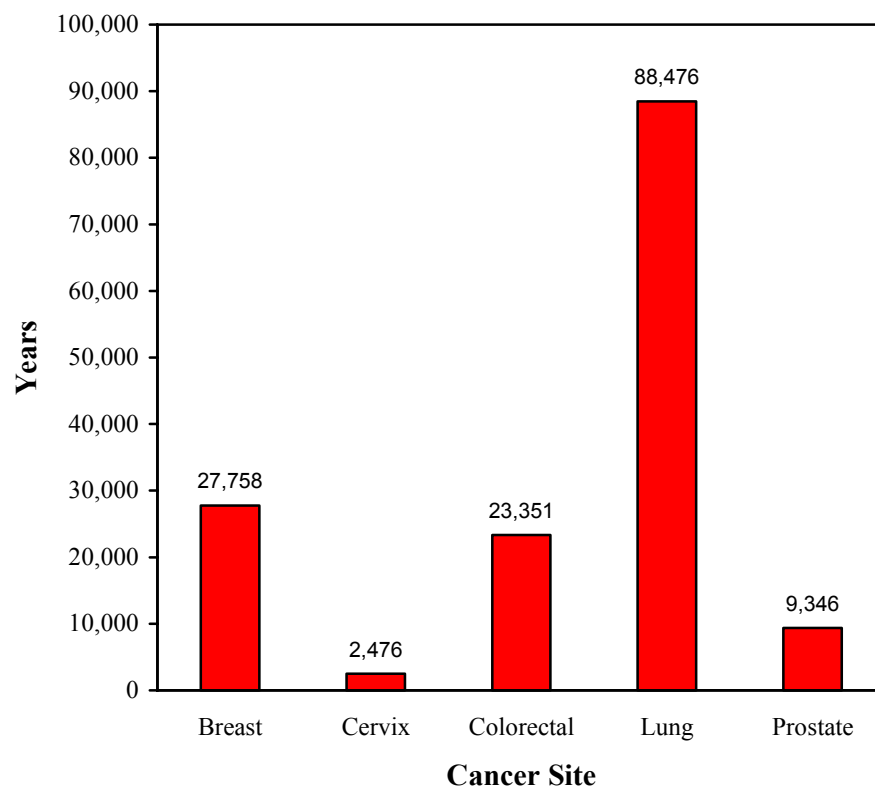


Figure 2.

## Total Person-Years of Life Lost due to Cancer, Michigan 1989-2003

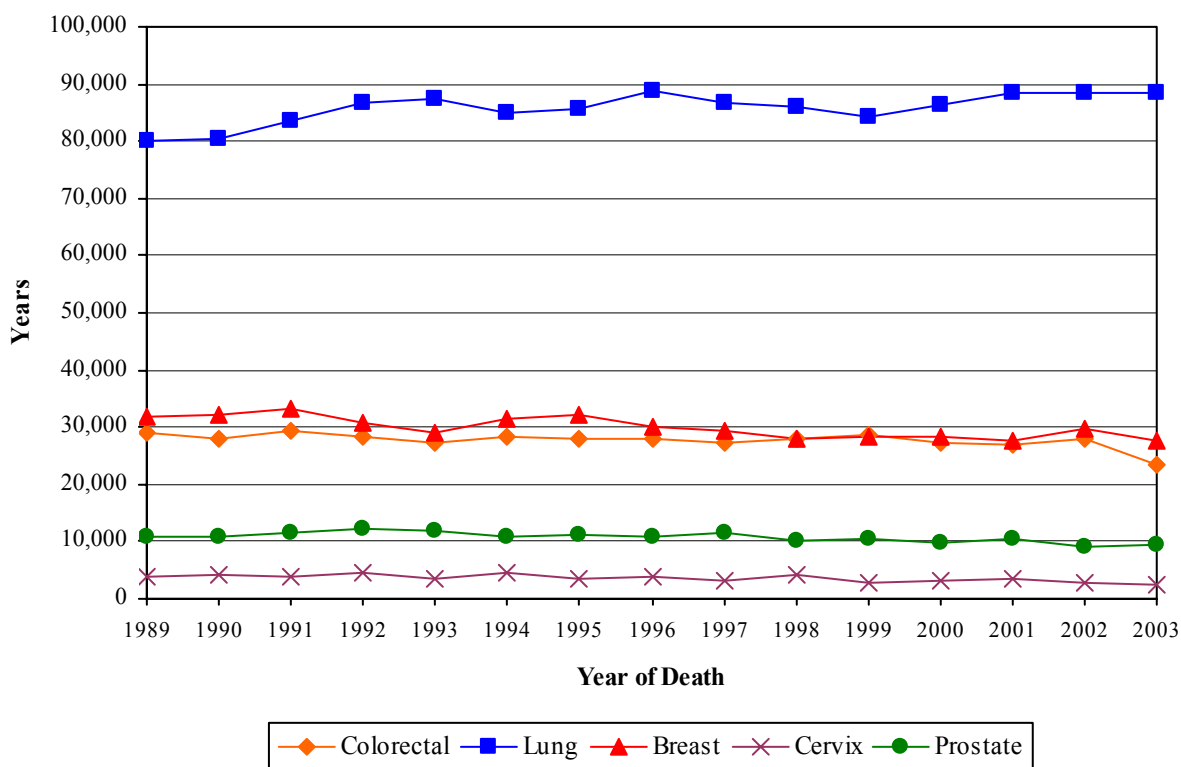


Figure 3.

Average Years of Life Lost due to Cancer,  
Michigan 1989-2003

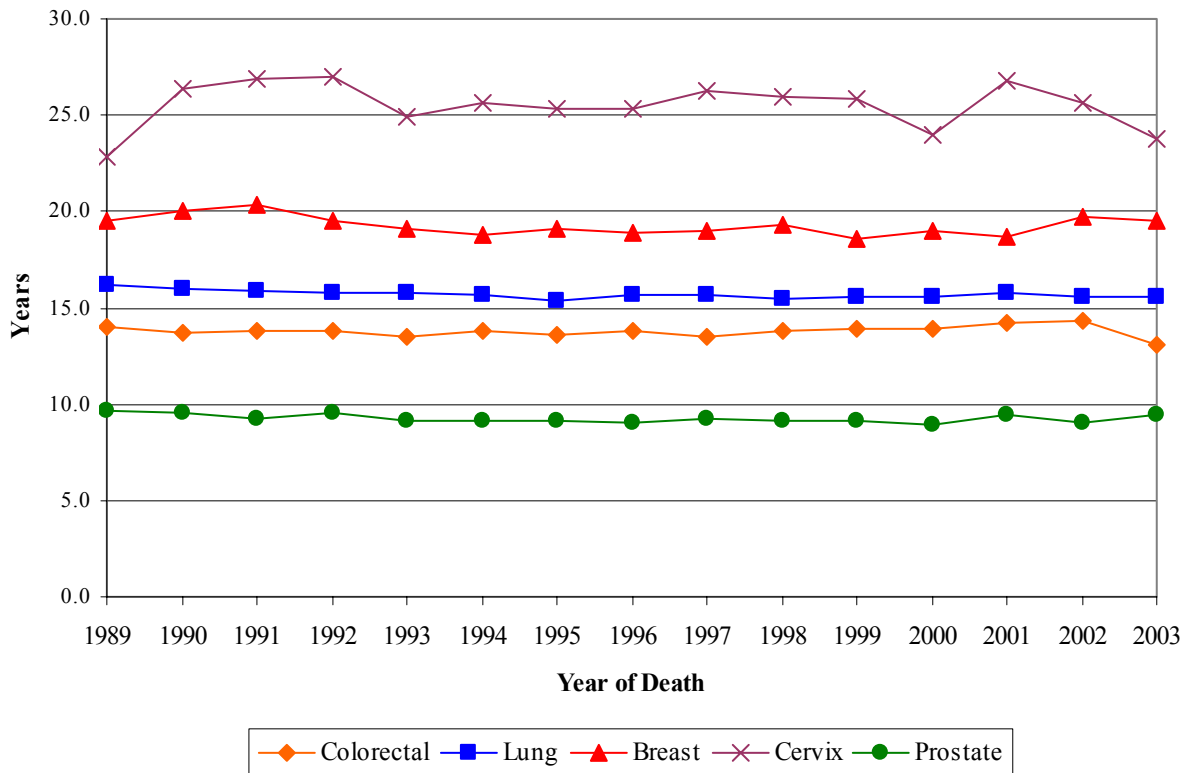


Figure 4.

Average Years of Life Lost by Cancer Site  
Michigan 2003 and US 2002

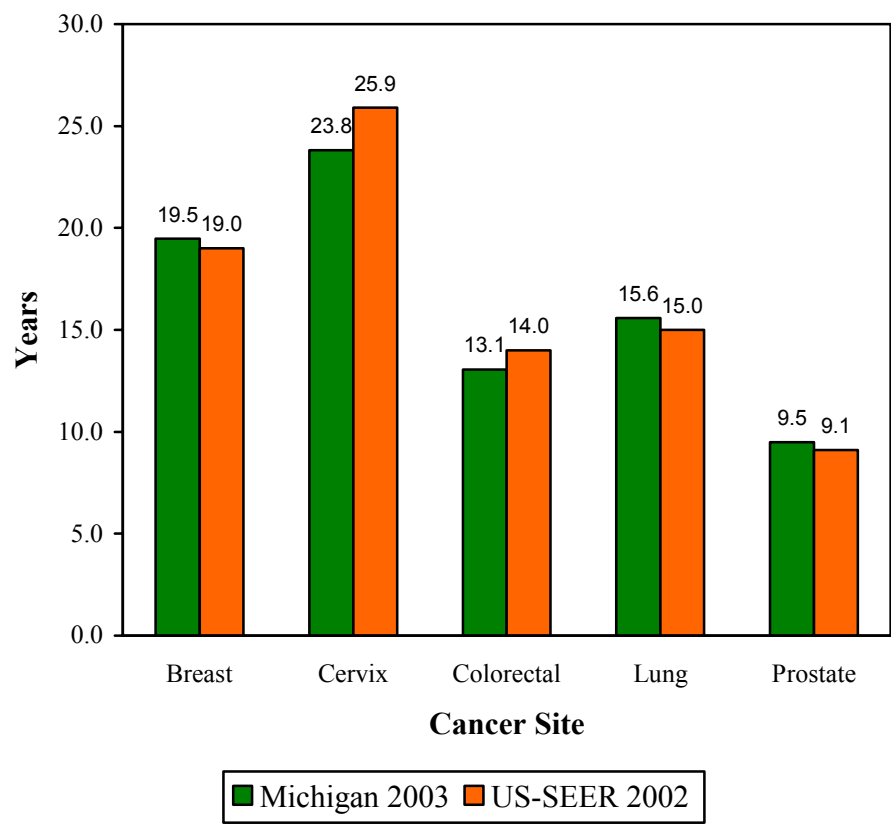
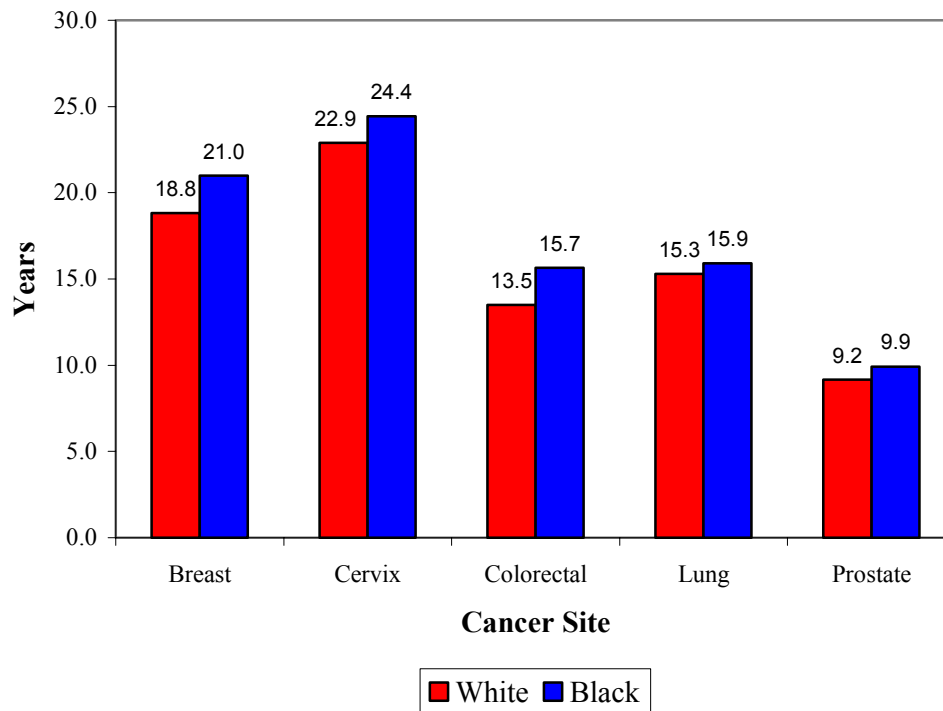


Figure 5.

## Average Years of Life Lost by Cancer Site and Race, Michigan 2003



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Figure 22: Hospital Days of Care for Medicare Part A Recipients by Cancer Site 2002 .....28

## Financial Cost

An update of reported paid medical claims associated with the existing cases of five selected cancers in Michigan are contained in this report. The financial data reflect treatment costs incurred annually for as many as eleven successive years, regardless of when the conditions became evident. The data contain costs associated with a range of treatments for patients at various stages in the course of their disease. Costs borne by patients and their families for deductibles, medications, home health care assistance and other non-medical expenses are not included in this analysis.

Medical costs are presented for each selected cancer site: breast, cervical, colorectal, lung and prostate. Medical costs are the direct costs incurred to secure medical treatment or costs that accrue to the health system. These costs include physician office visits, screening, counseling, diagnostic testing, hospitalization, and prescription drugs. Cost data associated with claims paid for self-insured and fee-for-service plans for the years 1996-2002 was made available from Blue Cross Blue Shield of Michigan<sup>1</sup> (BCBSM). Cost data associated with claims for the managed care plan, Blue Care Network (BCN), for 1999-2002, was also made available from BCBSM. Payment data for Medicare Part A and Medicare Part B were obtained from the Michigan Peer Review Organization and the Wisconsin Physician Service<sup>2</sup> respectively.

Ideally, medical costs reflect the true economic costs for goods and services. The true economic costs are equivalent to the value of foregone opportunities, otherwise described as opportunity costs. In the healthcare market, the terms medical costs and medical charges are often used interchangeably. However, medical charges typically do not represent the true economic costs of goods and services. The size and financial power of government and other large third-party payers greatly influence reimbursement to health systems for medical services. The ability of these entities to negotiate and pay discounted prices, accounts for significant discrepancies between costs and charges. The expenditures reported in this analysis reflect discounted medical costs or medical charges.

Reported medical charges were collected for a period of several years. To ensure that all charges are comparable, it is necessary to standardize all of the charges to the same year. The medical care component of the Consumer Price Index<sup>3</sup> was used to adjust subsequent years to a specified base year. Based on the average value of 1982-84 as 100, the relative annual value for each year was used to adjust dollars to the 1996 base year.

Selected cancer hospitalization data was received from the statewide hospital discharge database at the Michigan Department of Community Health<sup>4</sup>. Hospital admissions data for BCBSM and Medicare patients were also received from Blue Cross Blue Shield of Michigan and the Michigan Peer Review Organization, respectively. In-situ cases are included in the BCBSM, Medicare, and hospitalization datasets. Analyses of hospital admissions, number and rates of

---

<sup>1</sup> Blue Cross Blue Shield of Michigan, Center for Healthcare Quality; and Blue Care Network of Michigan.

<sup>2</sup> Wisconsin Physician Service, Medicare Central Data Unit.

<sup>3</sup> US Department of Labor, Bureau of Labor Statistics, *Bureau of Labor Statistics Data 1994-2004*.

<sup>4</sup> Michigan Resident Hospitalizations Files, Michigan Department of Community Health (MDCH), Division for Vital Records and Health Statistics.

days of care, average length of hospital stays, and number and rates of hospital discharges are reported for the years 1991-2002.

## **Summary**

BCBSM and BCN combined plans paid inpatient, outpatient, and professional claims charges totaling over \$203 million for the five cancer sites in Michigan during 2002. Paid charges during this year were 24% higher than paid charges the previous year. The BCBSM self-insured and fee-for-service plans alone posted a 31% increase, while the BCN managed care plan realized a 15% reduction in paid charges. Total hospital admissions for the selected cancer sites among the privately insured plans fluctuated from 7,724 admissions in 2000, down to 7,277 in 2001 (a 6% decrease), and back up to 7,861 admissions in 2002 (an 8% increase).

Michigan Medicare inpatient paid charges for breast, cervical, colorectal, lung, and prostate cancers totaled \$85 million in 2002, a 5% reduction from 2001. Medicare outpatient paid charges increased 6% from 2001 to 2002 for the 5 cancer sites in the state.

The average length of hospital stay associated with the five cancer sites continued a gradual downward trend in Michigan from 1991 through 2002. The rates of hospital days of care (patient days per 10,000 population) followed this same pattern during these years.

### **Breast Cancer**

Breast cancer accounted for the highest level of BCBSM outpatient and professional service paid charges among the five reported cancers. Professional services associated with the fee-for-service and self-insured BCBSM plans more than doubled from 1996 to 2002 in terms of paid charges and number of patients served. BCBSM inpatient per case average charges decreased 2% from 2001 to 2002, the third consecutive annual decline.

The number of Medicare patients receiving inpatient treatment for breast cancer in Michigan decreased 15% from 2001 to 2002. While the Medicare inpatient per case average continued to decline (4% from 2001), the average length of hospital stay for these patients remained steady at 2.2 days.

### **Cervical Cancer**

From 1996 to 2002, BCBSM inpatient per case average charges for cervical cancer treatment decreased 14%. From 1999 to 2002, BCN inpatient per case average charges decreased 15%. The average length of hospital stay fluctuated from year to year for both plan types.

Between 2001 and 2002, BCBSM and BCN per case average charges for cervical cancer outpatient services increased 7% and 5%, respectively. BCBSM per case average charges for professional claims increased 13% over the same timeframe.

Medicare inpatient services associated with cervical cancer incurred a 30% increase in per case average paid charges and a 25% increase in average length of hospital stay between 2001 and 2002.

### **Colorectal Cancer**

BCBSM colorectal cancer per case average charges for inpatient treatment and professional services decreased 20% and 24%, respectively from 1996 to 2002. The average length of hospital

stay for BCBSM colorectal cancer patients increased from a 6-year low of 6.14 days in 2001 to 7.64 days in 2002, its highest level since 1998.

The downward trend in Medicare colorectal inpatient per case average charges continued. These charges decreased 13% from 1996 to 2002.

### **Lung Cancer**

BCBSM per case average charges associated with inpatient treatment for lung cancer decreased 21% from 1996 to 2002. The number of hospital admissions attributable to this cohort decreased 20% over the same period. However the average length of hospital stay fluctuated. BCBSM also realized a 12% decrease in per case average charges for professional services attributable to lung cancer treatment from 1996 to 2002. Lung cancer outpatient per case average charges for this plan type rose 25% over the 7-year period. BCN inpatient per case average charges and number of hospital admissions decreased 25% and 28%, respectively from 1999 to 2002.

Medicare inpatient per case average charges and average length of hospital stay for lung cancer treatment declined 18% and 10% respectively, from 1996 to 2002. However, the number of Michigan Medicare patients receiving inpatient services for treatment of lung cancer increased 26% from 1996 to 2002.

### **Prostate Cancer**

From 1996 to 2002, the BCBSM inpatient per case average charges and average length of hospital stay associated with prostate cancer treatment decreased 34% and 32%, respectively. However, BCBSM outpatient per case average charges increased 18% over the same period for this cancer site.

Medicare prostate cancer inpatient per case average charges and average length of hospital stay, both decreased 20%, from 1996 to 2002. The number of Medicare patients receiving inpatient services for the treatment of prostate cancer in Michigan rose from 1,992 in 1996 to 2,040 patients in 2002, a 2% increase.

Figure 1.

Percent of Total BCBSM Inpatient Payments  
Made for the Selected Cancer Sites by Cancer Site,  
Michigan 2002

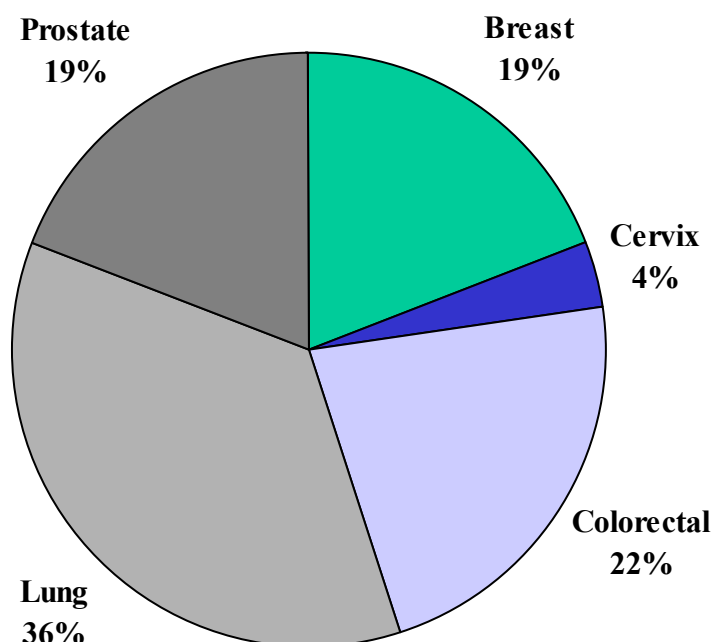


Figure 2.

## Percent of Total BCBSM Professional Payments Made for the Selected Cancer Sites by Cancer Site, Michigan 2002

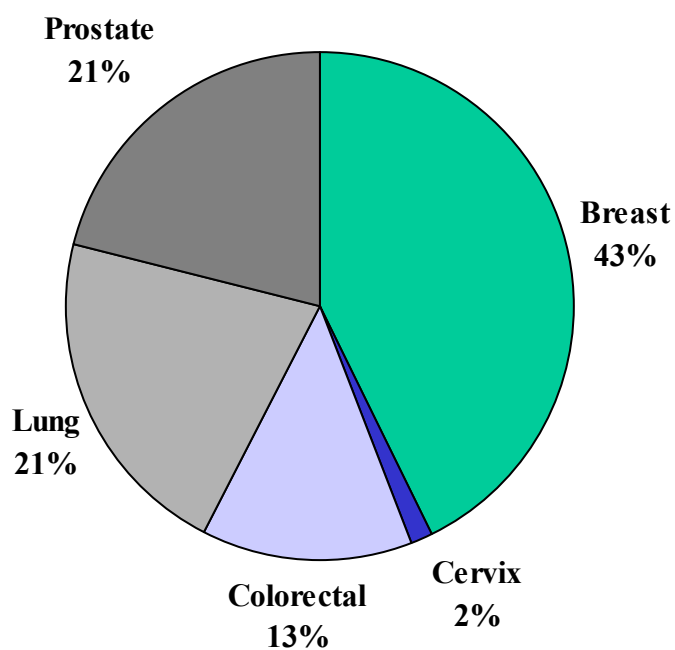


Figure 3.

# Percent of Total BCBSM Outpatient Payments Made for the Selected Cancer Sites by Cancer Site, Michigan 2002

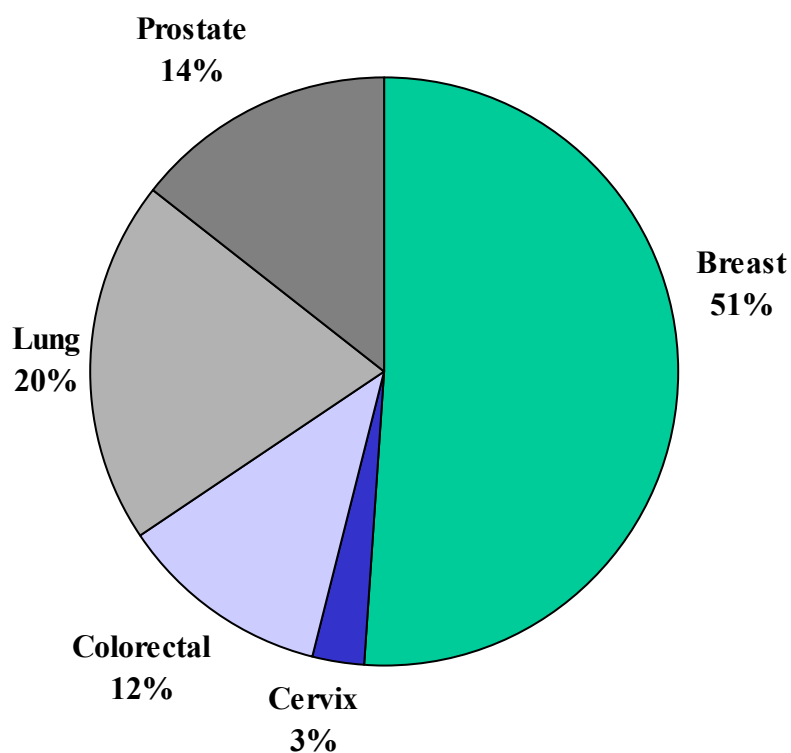


Figure 4.

Percent of Total Medicare Part A Payments  
Made for the Selected Cancer Sites by Cancer Site,  
Michigan 2002

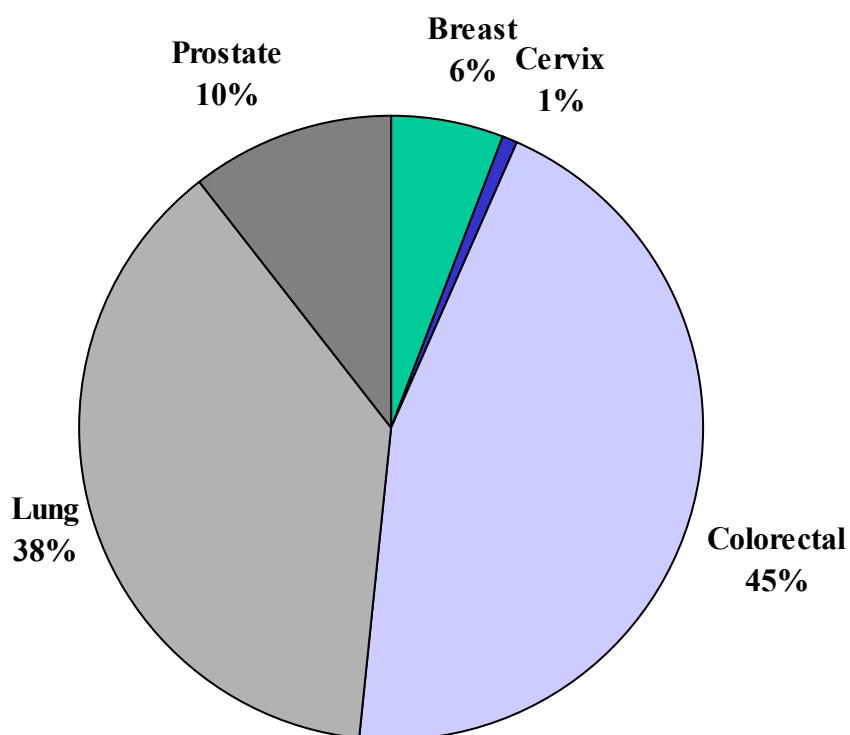


Figure 5.

Percent of Total Medicare Part B Payments  
Made for the Selected Cancer Sites by Cancer Site,  
Michigan 2002

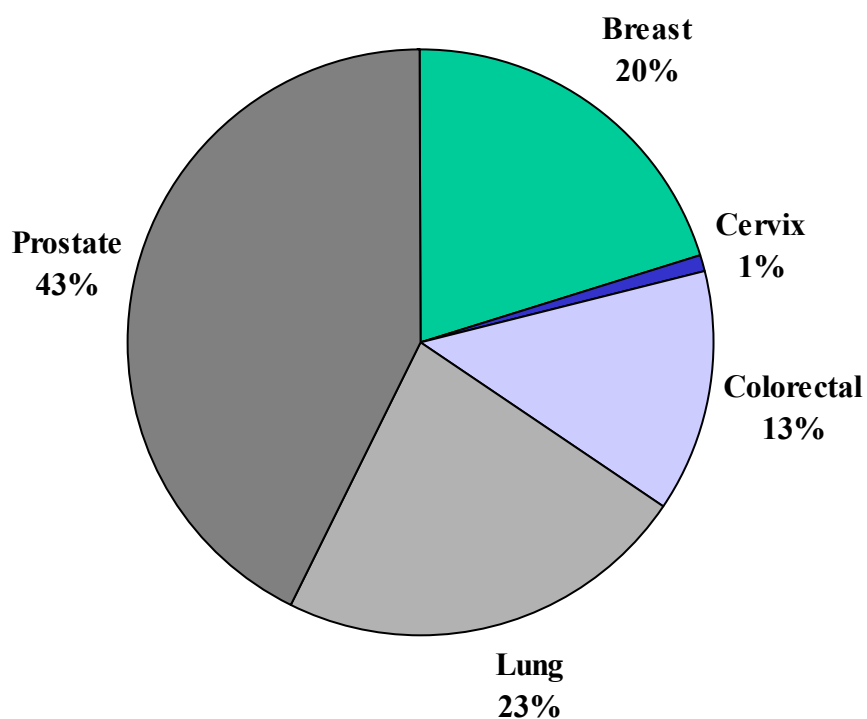


Figure 6.

## Hospital Average Length of Stay by Cancer Site, Michigan 1991-2002

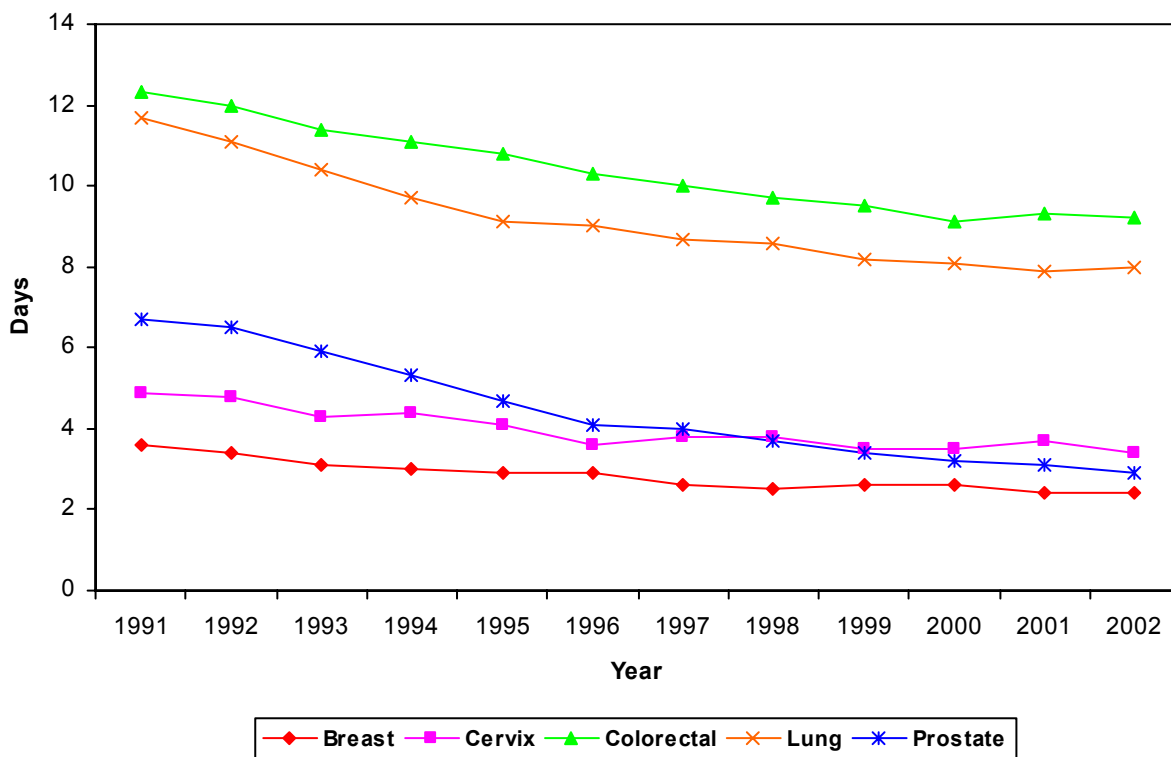


Figure 7.

## Total Hospital Days of Care by Cancer Site, Michigan 1991-2002

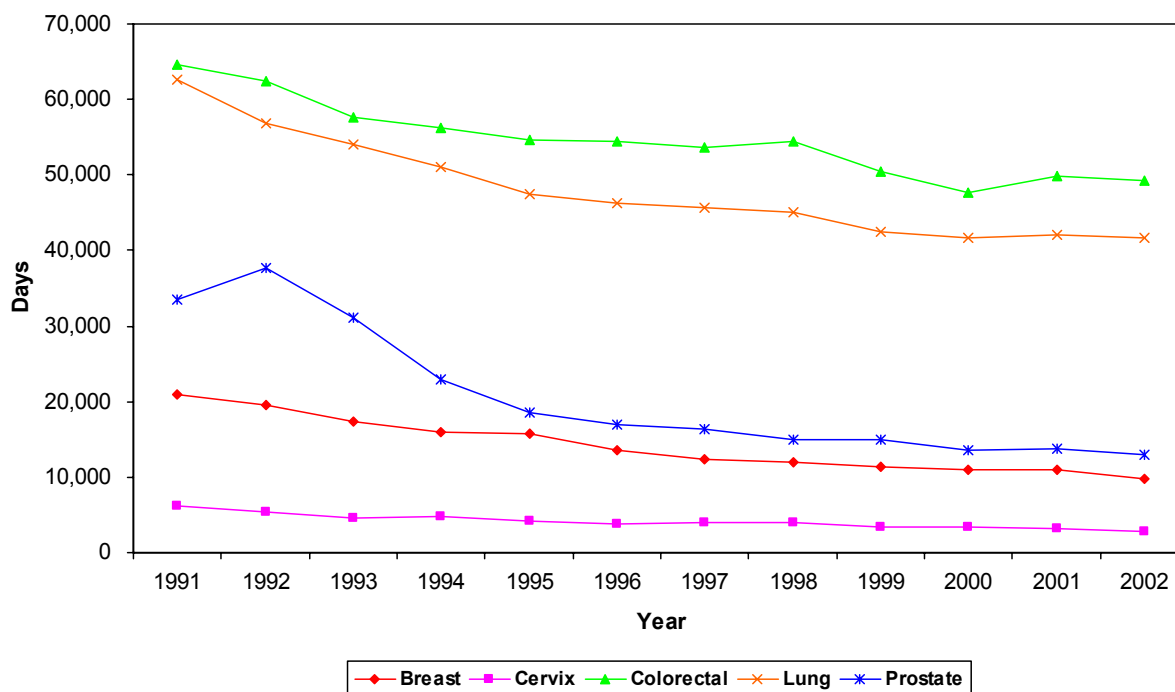


Figure 8.

## Hospital Discharges by Cancer Site, Michigan 2002

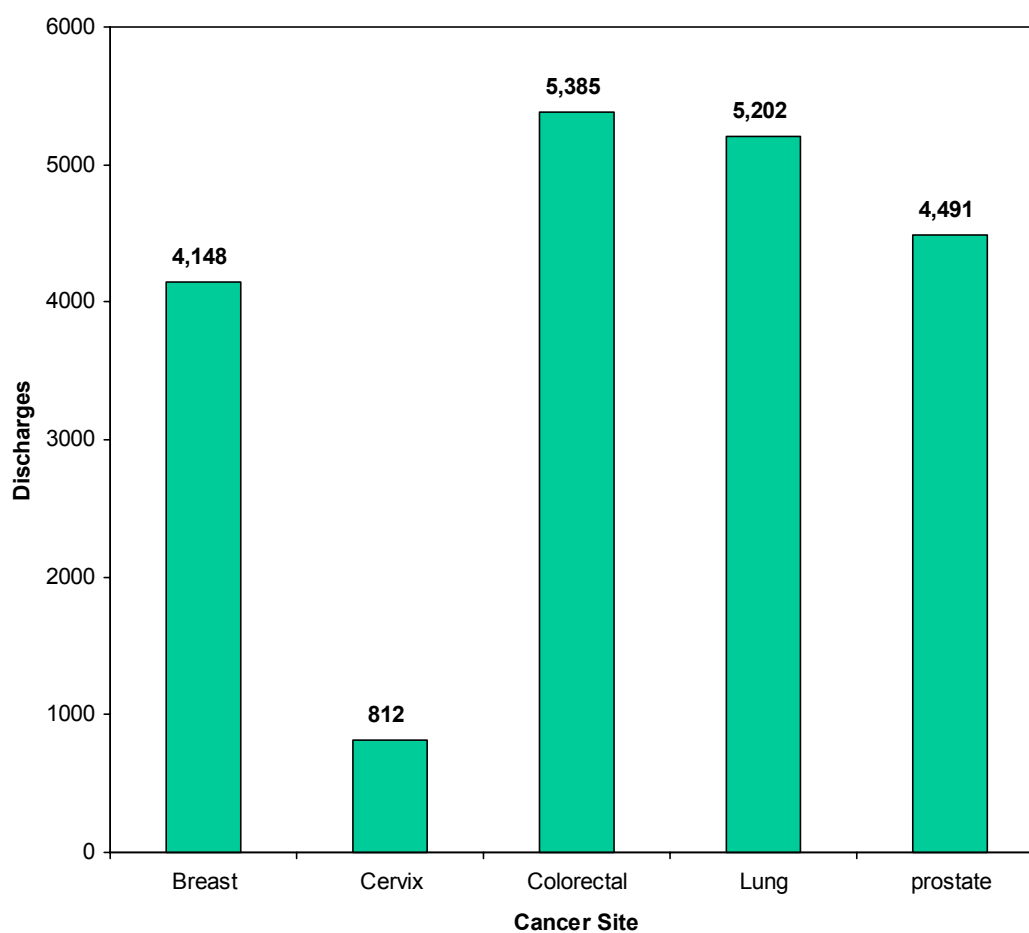
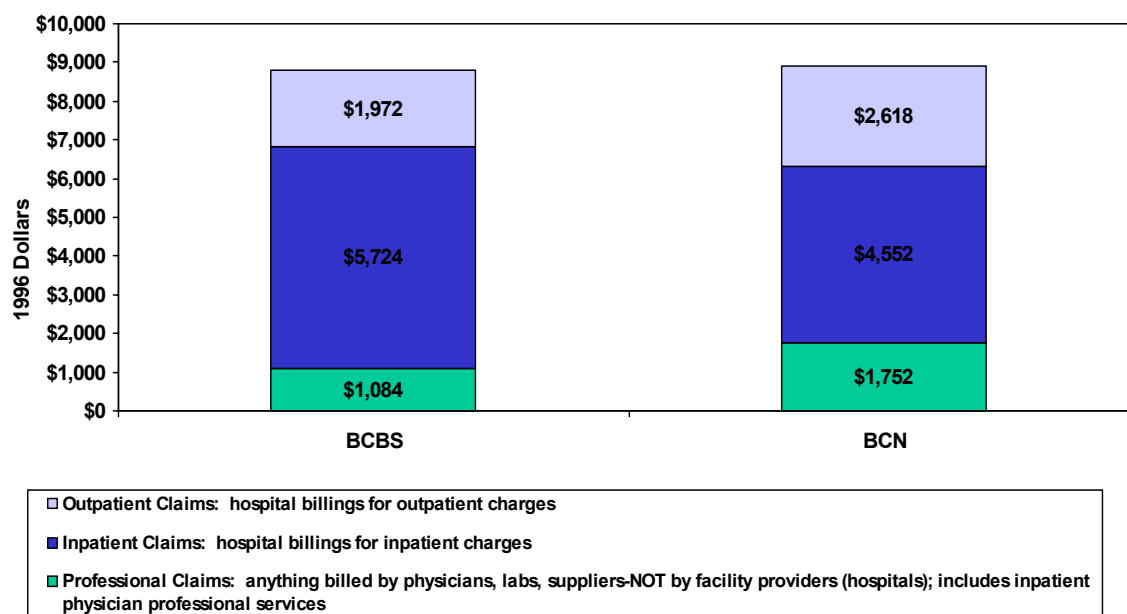


Figure 9.

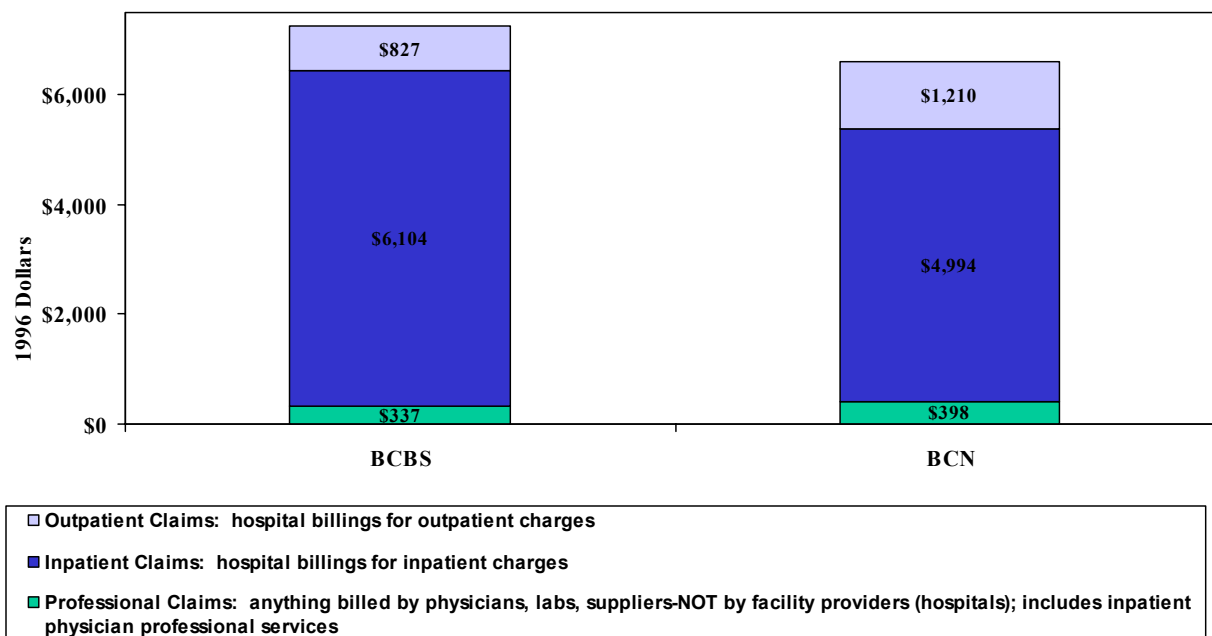
## Breast Cancer 2002 Per Case Average BCBSM Payments by Type of Claim



BCBS: fee-for-service and self-insured plans  
BCN: managed care plan

Figure 10.

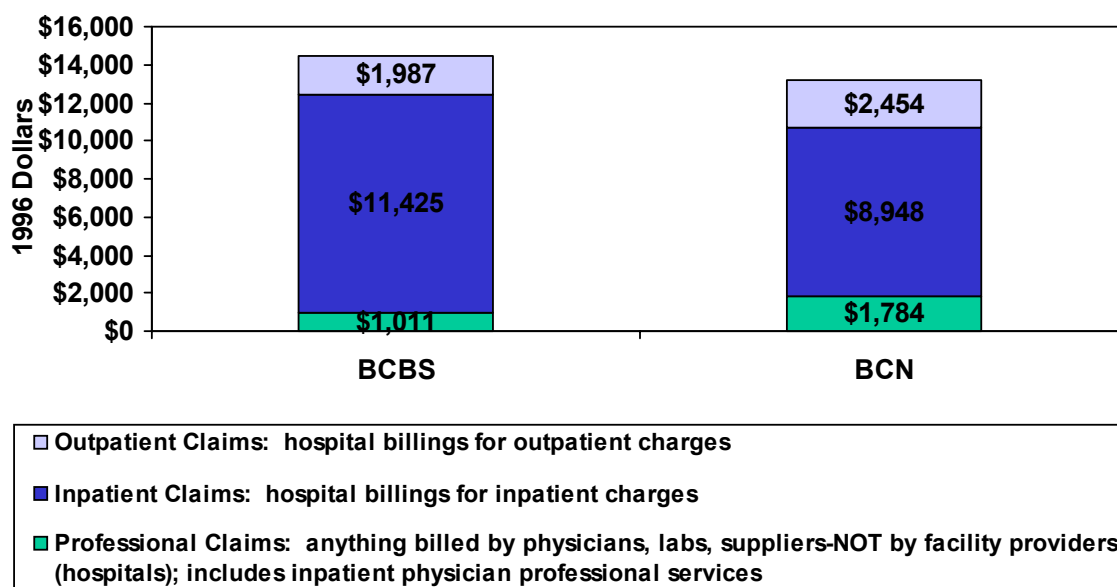
## Cervical Cancer 2002 Per Case Average BCBSM Payments by Type of Claim



BCBS: fee-for-service and self-insured plans  
BCN: managed care plan

Figure 11.

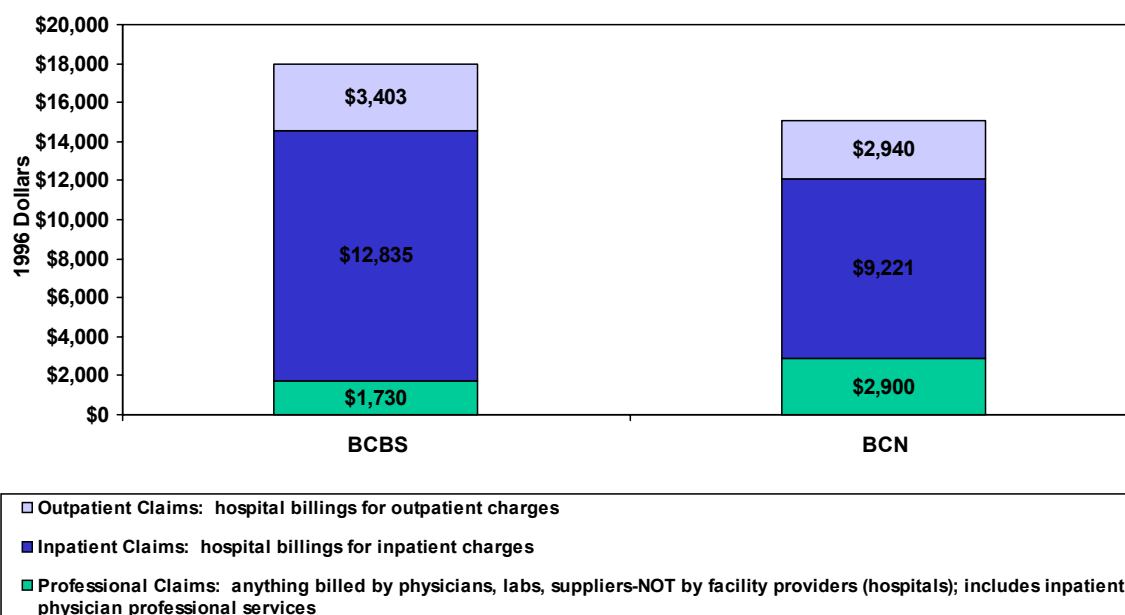
## Colorectal Cancer 2002 Per Case Average BCBSM Payments by Type of Claim



BCBS: fee-for-service and self-insured plans  
BCN: managed care plan

Figure 12.

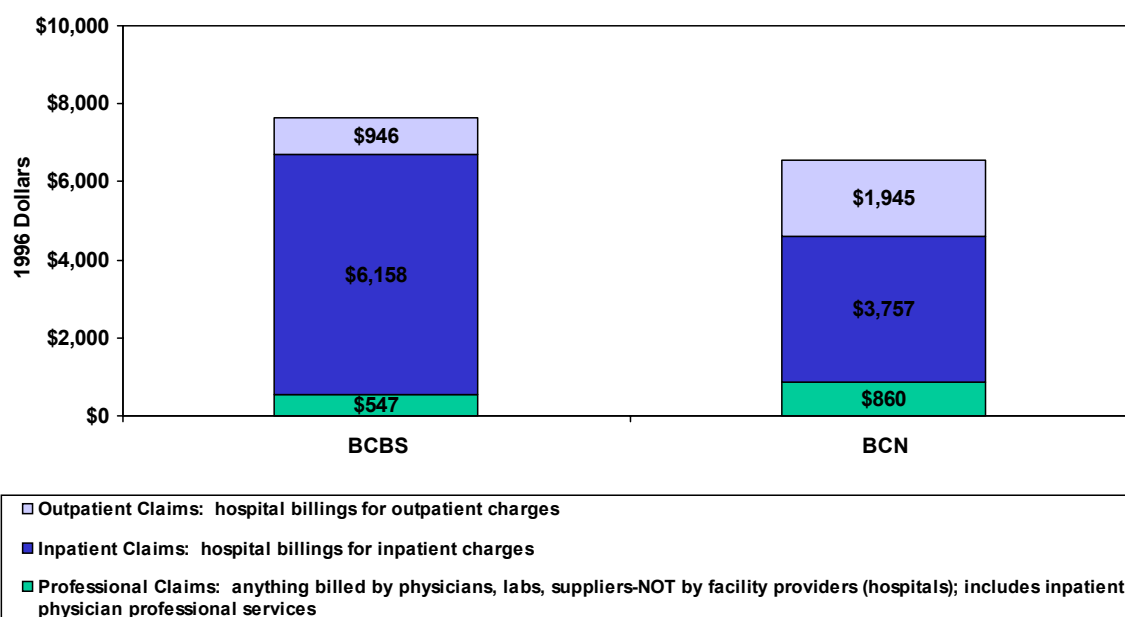
## Lung Cancer 2002 Per Case Average BCBSM Payments by Type of Claim



BCBS: fee-for-service and self-insured plans  
BCN: managed care plan

Figure 13.

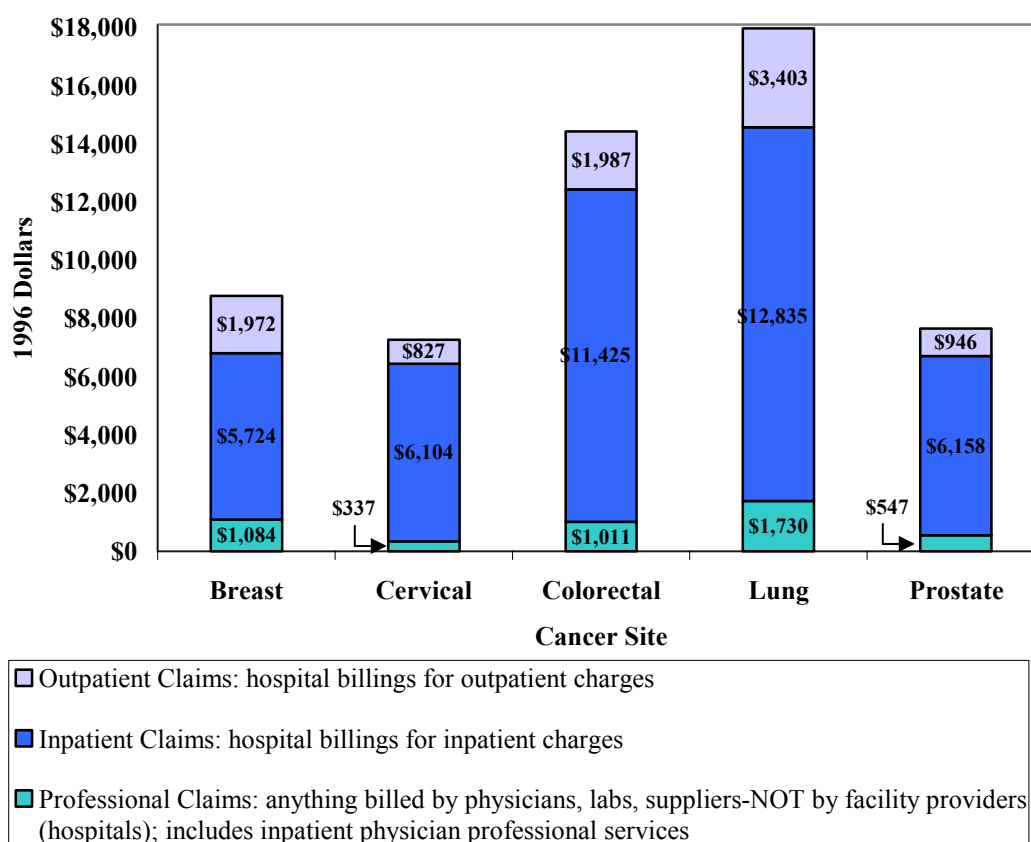
## Prostate Cancer 2002 Per Case Average BCBSM Payments by Type of Claim



BCBS: fee-for-service and self-insured plans  
BCN: managed care plan

Figure 14.

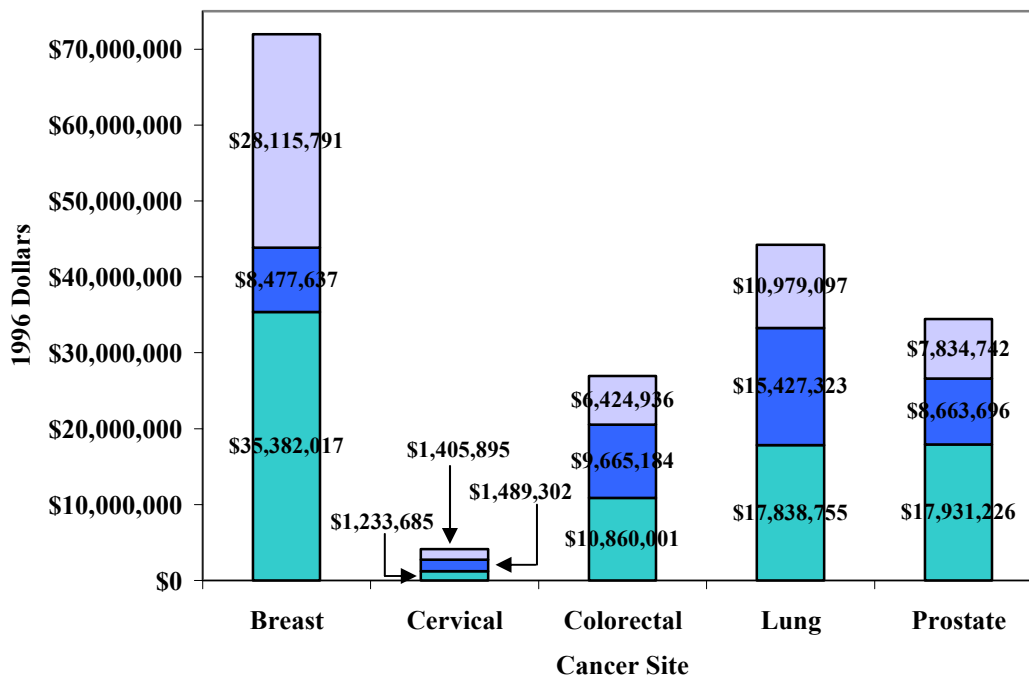
## Per Case Average BCBSM\* Payments by Type of Claim and Cancer Site (2002)



\*Excludes managed care plan.

Figure 15.

## Total BCBSM\* Payments by Type of Claim and Cancer Site (2002)

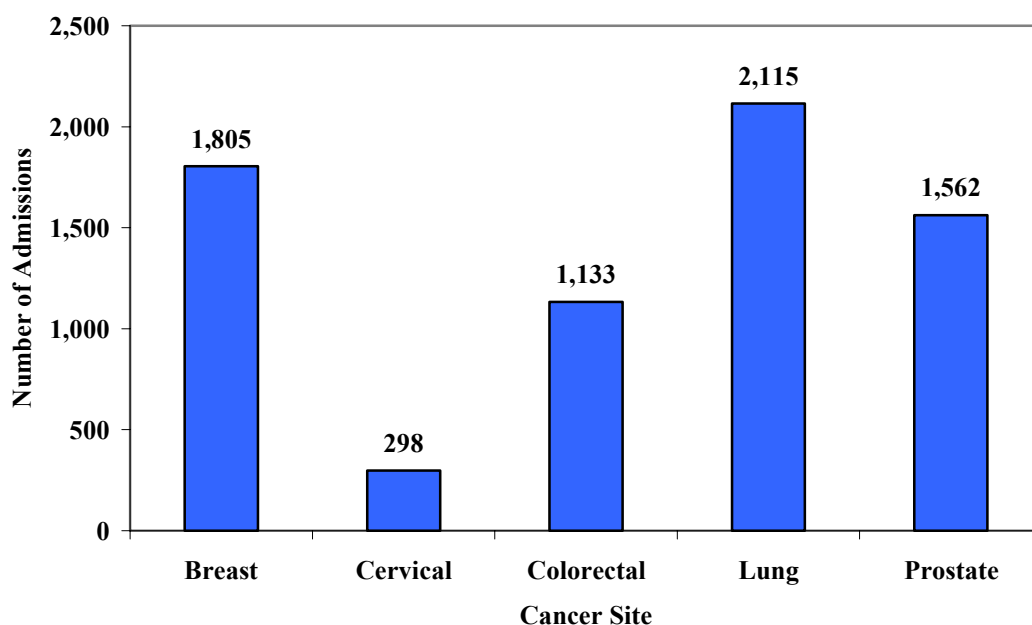


- Outpatient Claims: hospital billings for outpatient charges
- Inpatient Claims: hospital billings for inpatient charges
- Professional Claims: anything billed by physicians, labs, suppliers-NOT by facility providers (hospitals); includes inpatient physician professional services

\*Excludes managed care plan.

Figure 16.

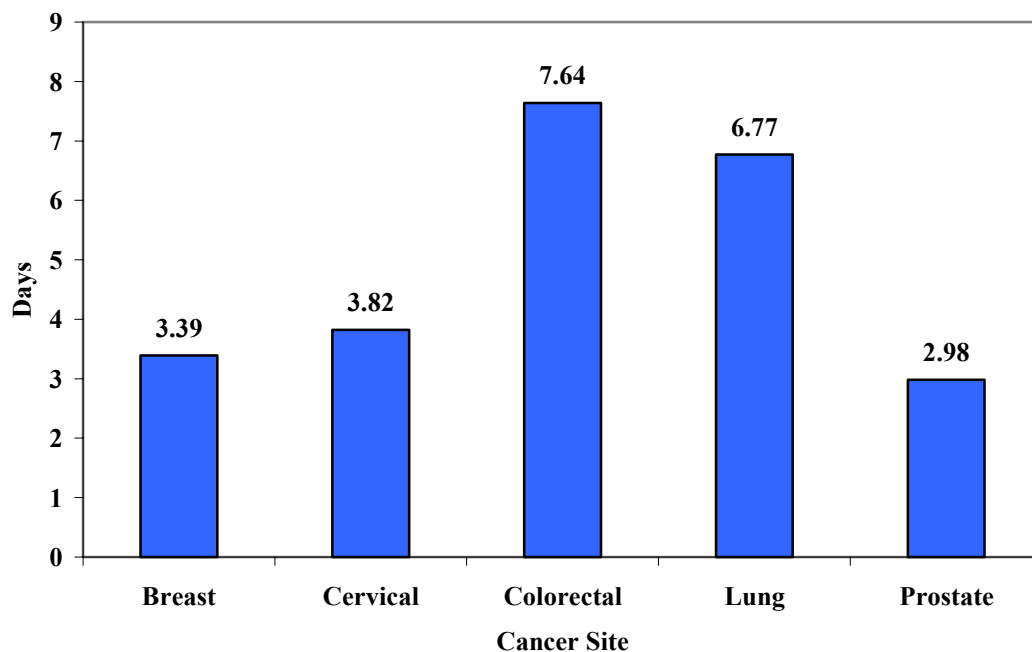
## Number of Hospital Admissions for BCBSM\* Inpatient Coverage Recipients by Cancer Site (2002)



\*Excludes managed care plan.

Figure 17.

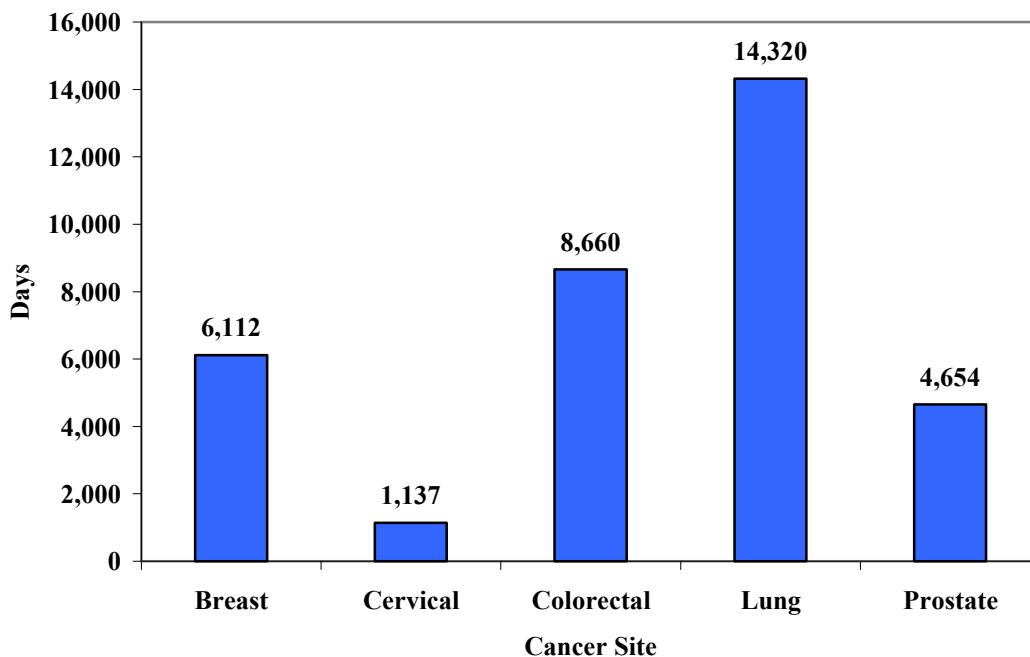
## Hospital Average Length of Stay for BCBSM\* Inpatient Coverage Recipients by Cancer Site (2002)



\*Excludes managed care plan.

Figure 18.

## Total Hospital Days of Care for BCBSM\* Inpatient Coverage Recipients by Cancer Site (2002)



\*Excludes managed care plan.

Figure 19.

## Per Case Average Medicare Part A Payments By Cancer Site (2002)

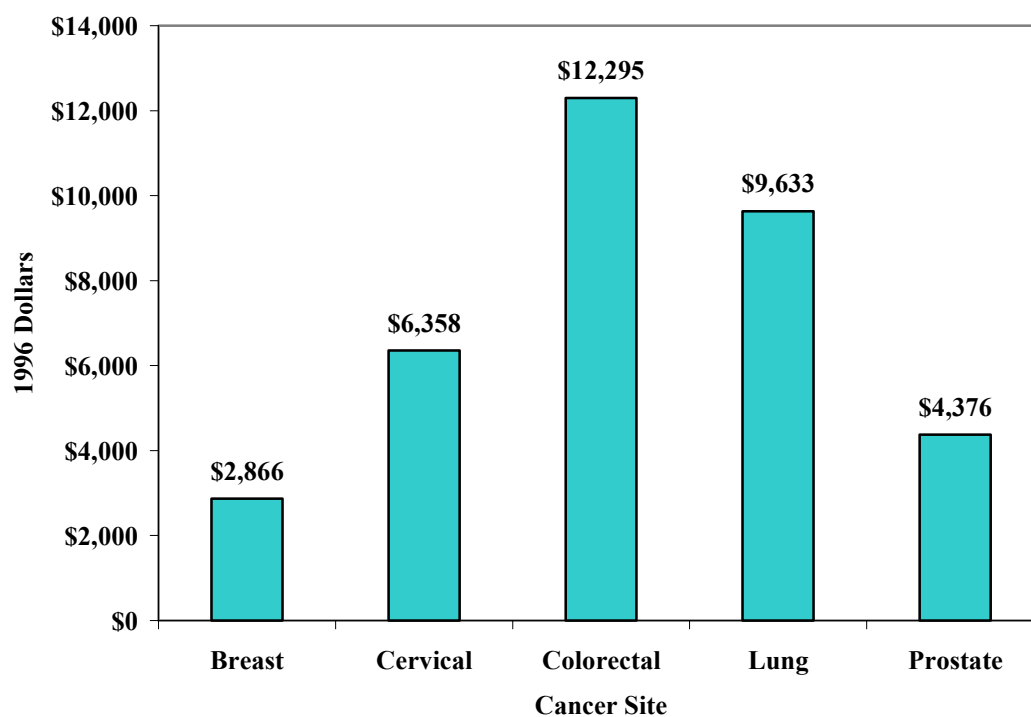


Figure 20.

## Total Medicare Part A Payments By Cancer Site (2002)

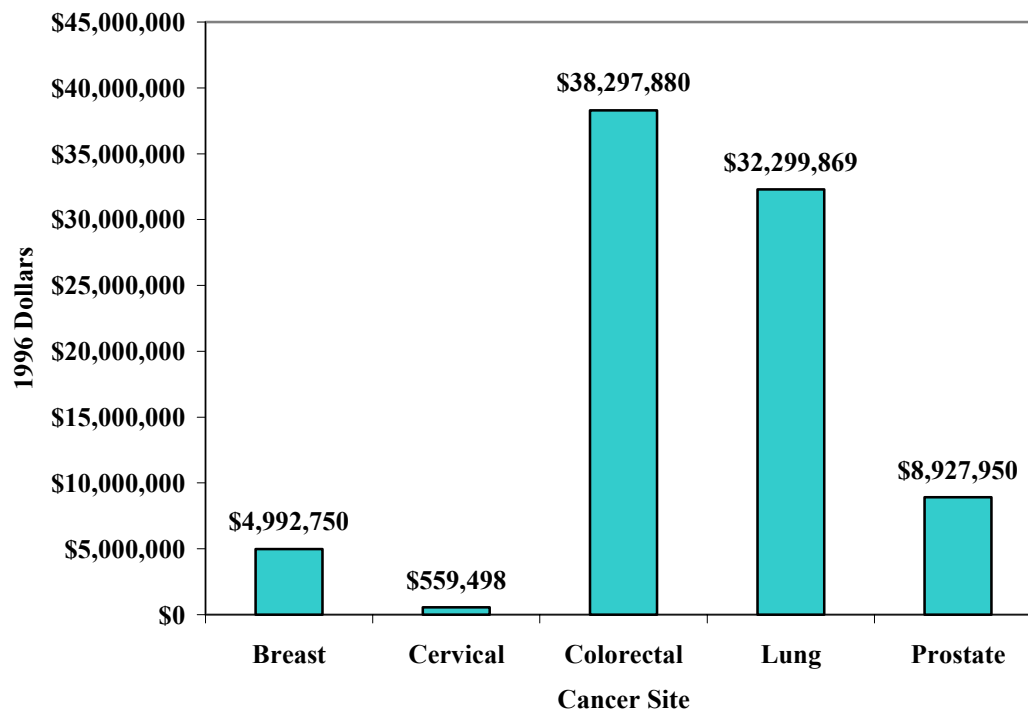


Figure 21.

## Hospital Average Length of Stay for Medicare Part A Recipients by Cancer Site (2002)

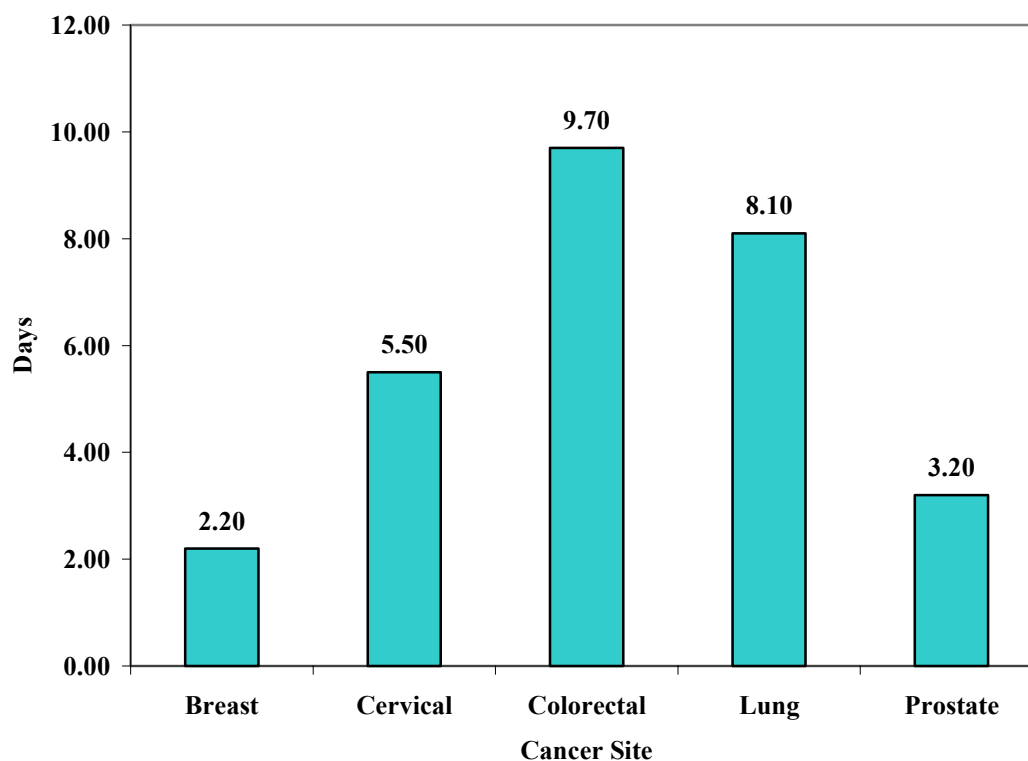
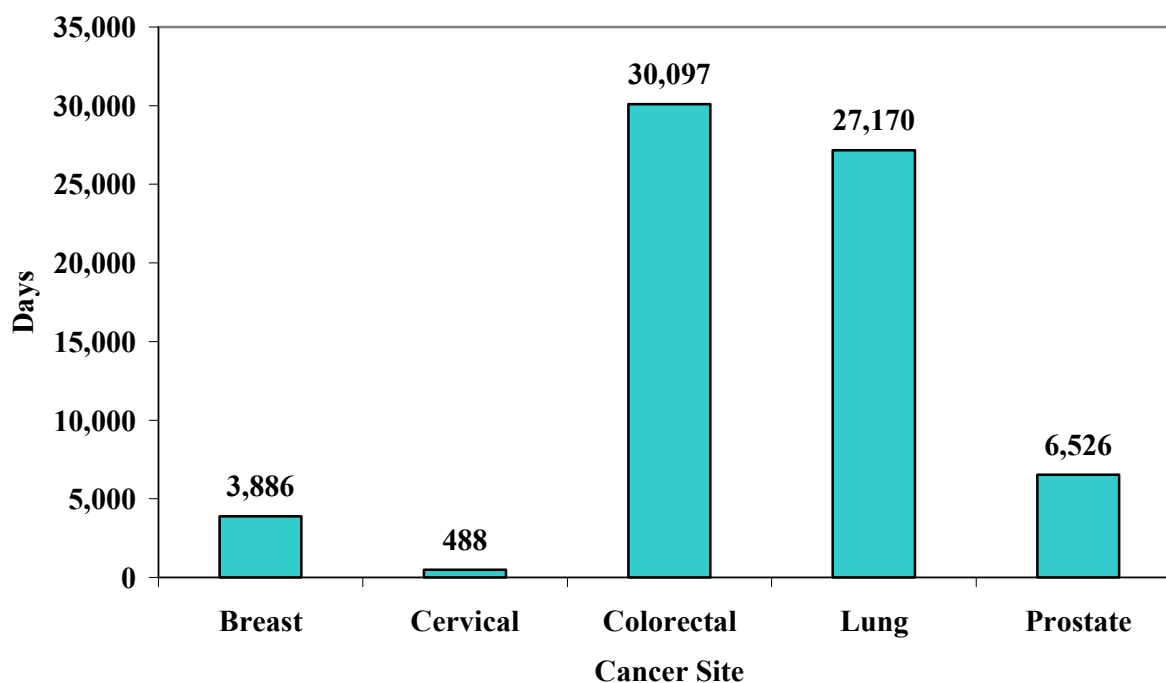


Figure 22.

## Hospital Days of Care for Medicare Part A Recipients by Cancer Site (2002)



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## **Mammography and Radiation Facility Distribution in Michigan**

The numbers of mammography and radiation therapy facilities per county are presented within this section. Facility information was received from the Michigan Department of Community Health, Radiation Safety Section.<sup>1</sup> Mammography and radiation therapy facilities were geocoded by Zip codes using Geographic Information System (GIS) software, and their locations throughout the state are shown.<sup>2</sup> Distance analysis was performed to calculate the proportion of women in Michigan that are farther than 30 miles from any mammography facility and the proportion of the total population that is farther than 45 miles from any radiation therapy facility.<sup>3</sup> Population data from U.S. Census 2000 are presented to illustrate potential demand for mammography and radiation therapy facilities in counties.<sup>4</sup>

### Summary

Within a priority objective of the Michigan Cancer Consortium Initiative (MCCI) related to breast cancer screening is the objective that all women should have access to clinical breast examination and mammography within 30 miles or 30 minutes of their home. Figures 1 through 4 present mammography facility and radiation therapy facility locations throughout the state and female and total population sizes by county. Analyses of mammography facility locations found that 99.8% of the female population in Michigan is within 30 miles of a mammography facility. Analysis also included radiation therapy facility locations and found 2.2% of the total Michigan population is farther than 45 miles from any radiation therapy facility. Direct distances between points are analyzed rather than actual road distance traveled. This analysis does not describe factors affecting the ease of accessibility to facilities such as the availability of public transportation, nor does it describe the utilization of the facilities.

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<sup>1</sup> Michigan Department of Community Health, Radiation Safety Section; "Mammography Facility Status in Michigan" and "Therapy Accelerator Facilities in Michigan", May 9, 2005.

<sup>2</sup> ESRI's ArcView GIS was used for mapping locations of facilities. When Zip codes provided by the Michigan Department of Community of Health were not matched with Zip codes in the ArcView data for geocoding, the Zip Code Lookup on the US Postal Service website was used to find Zip codes according to street addresses.

<sup>3</sup> Distance analyses were performed using an Equidistant Conic Projection for the Contiguous United States. Distances from the center points of Zip code areas to the center of census block groups were calculated, and the populations of block groups in 1990 were used to determine the approximate proportions of population subgroups that are within a specified distance from a facility.

<sup>4</sup> U.S.Census Bureau, Census 2000, Summary File 4.

Figure 1.

## Number of Mammography Facilities by County, 2005

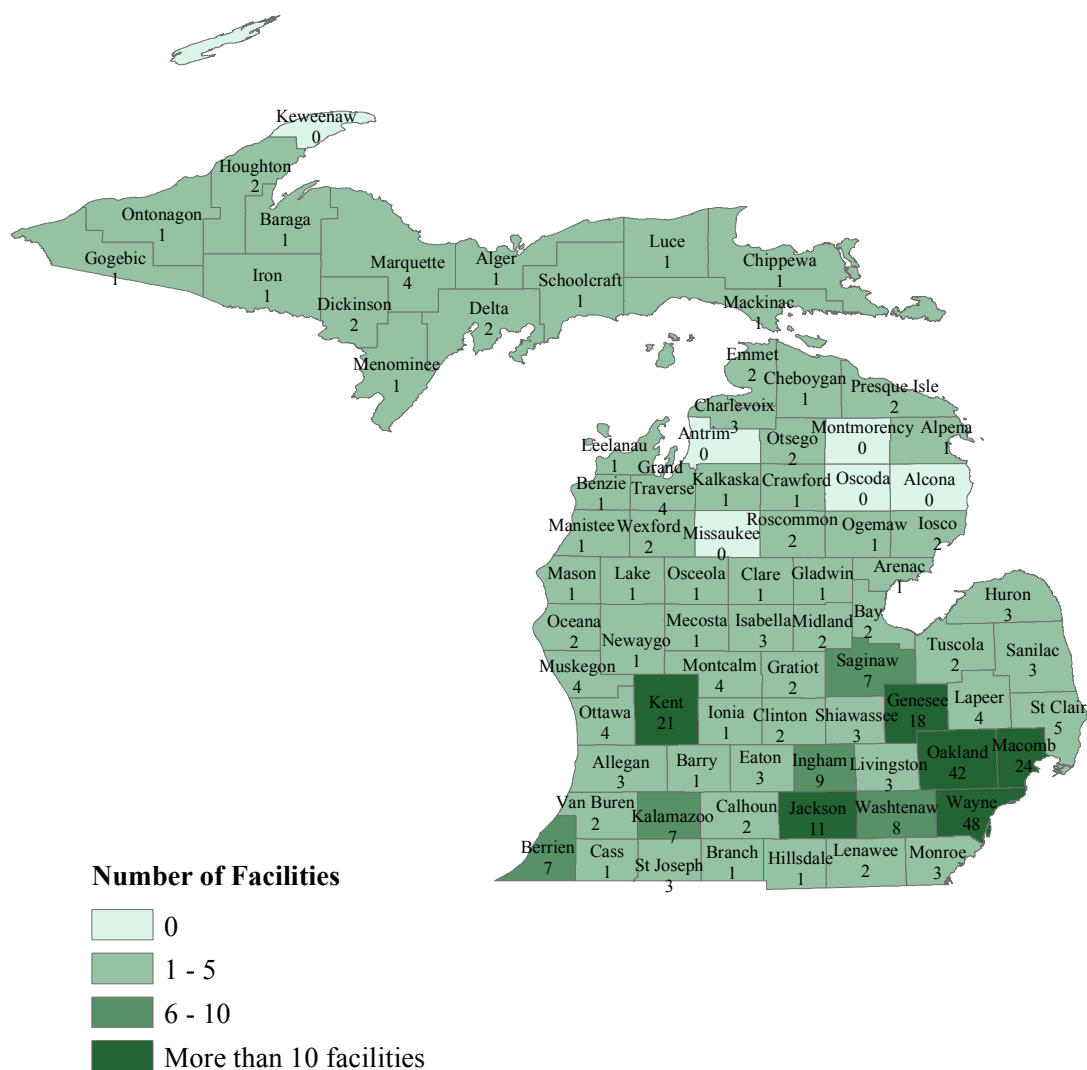


Figure 2.

## Locations of Mammography Facilities by Female Population Age 40 Years and Older and County

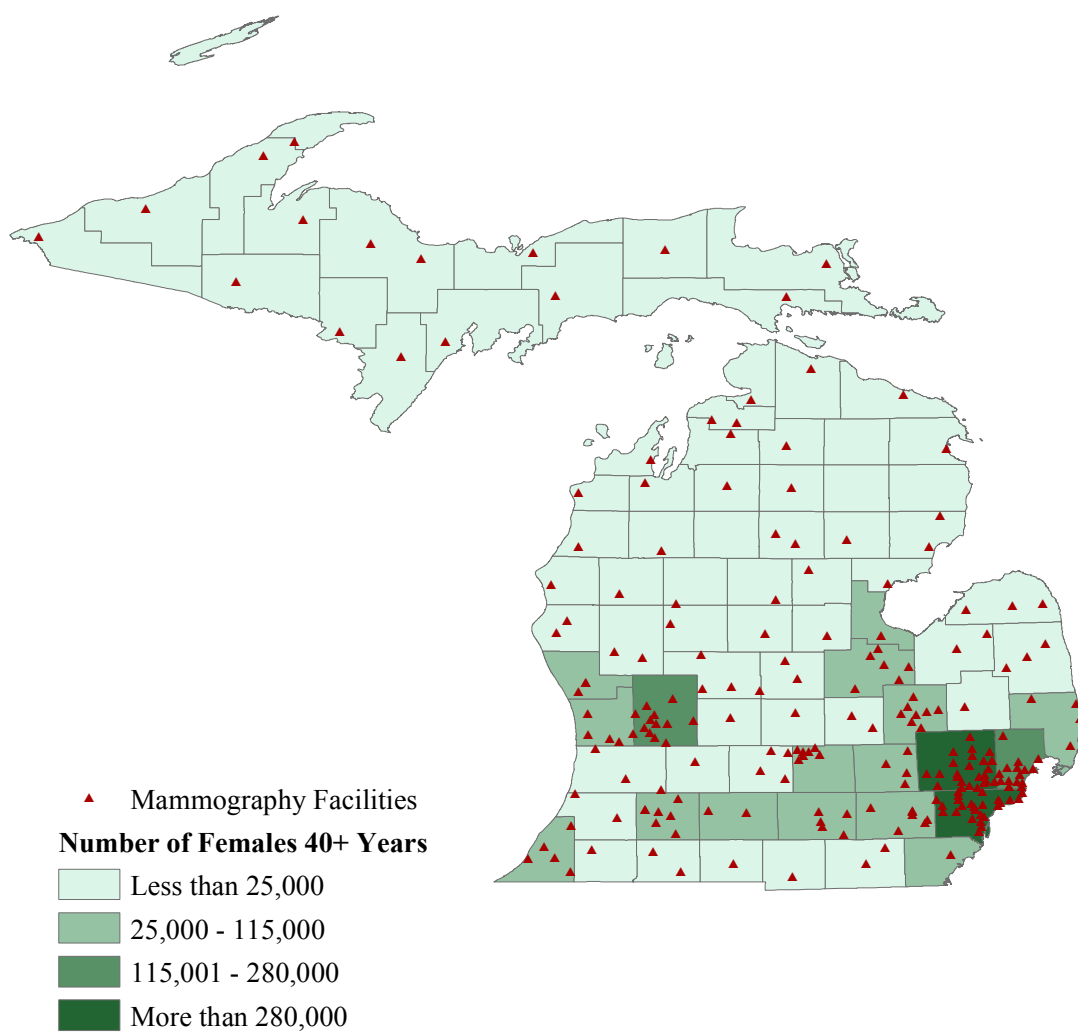


Figure 3.

## Number of Radiation Therapy Facilities by County, 2005

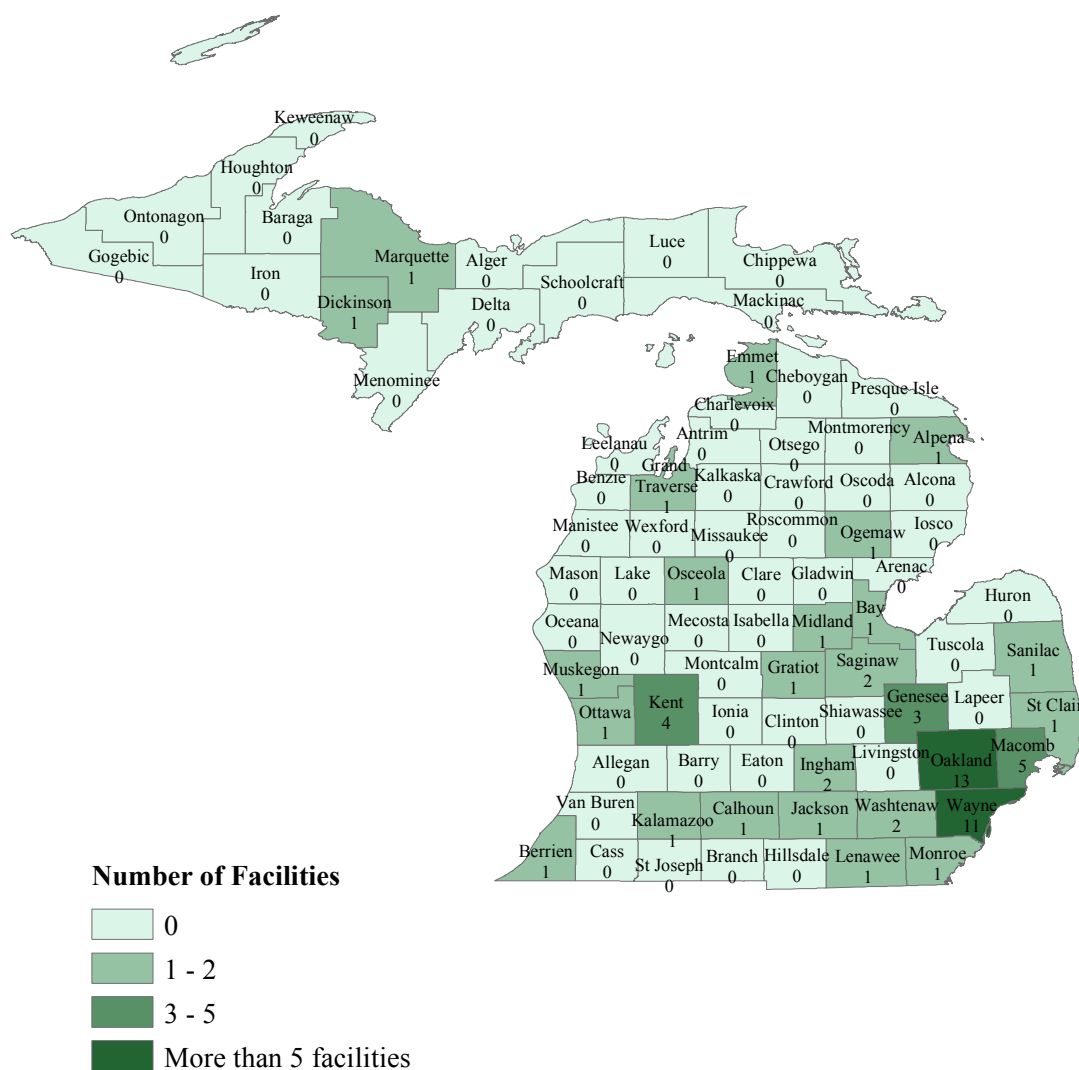
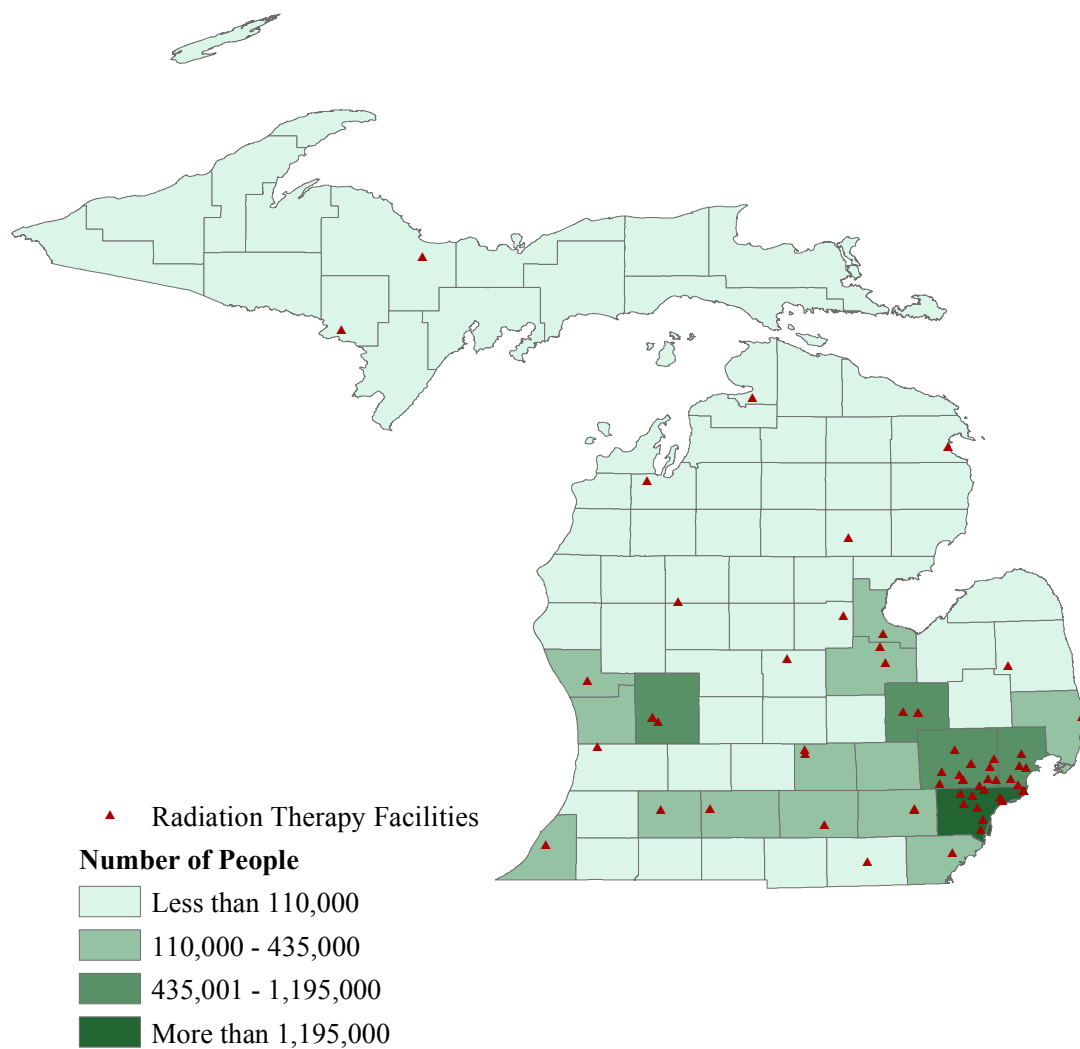


Figure 4.

## Locations of Radiation Therapy Facilities by Total Population and County



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Table 1.

## Breast, Cervical, Colorectal, Lung and Prostate Cancer Mortality Rates by County, Michigan 1994-2003

County	Age-Adjusted Rate per 100,000 Population*				
	Breast	Cervical	Colorectal	Lung	Prostate
Alcona	36.6±13.8	0.0±0.0	19.9±6.1	61.0±10.2	27.3±8.3
Alger	17.9±9.8	0.0±0.0	14.1±5.9	59.3±13.0	39.9±14.5
Allegan	24.7±3.9	2.2±1.3	21.2±2.6	54.5±4.4	34.6±4.3
Alpena	28.7±7.2	2.0±2.0	20.6±4.3	55.6±7.1	37.0±6.9
Antrim	35.1±9.1	2.2±2.3	18.5±4.4	59.0±8.4	47.2±8.9
Arenac	27.7±9.8	4.6±4.6	19.7±5.3	59.5±9.9	31.9±9.3
Baraga	19.4±9.4	1.4±2.8	16.2±5.9	56.2±13.2	37.7±10.5
Barry	30.0±6.0	1.4±1.3	17.8±3.2	51.4±5.7	34.0±5.8
Bay	24.6±3.5	2.1±1.2	19.3±2.2	62.7±4.2	31.5±3.8
Benzie	23.4±8.7	2.4±3.3	15.8±4.6	55.2±9.8	28.7±7.7
Berrien	26.7±3.1	4.0±1.3	20.4±1.9	61.5±3.5	30.4±3.2
Branch	24.6±5.6	3.0±2.2	18.6±3.6	60.3±6.7	22.8±5.8
Calhoun	30.9±3.6	2.3±1.0	22.4±2.2	60.3±3.8	32.2±3.7
Cass	27.3±5.6	2.2±1.8	22.8±3.6	64.9±6.4	32.3±5.9
Charlevoix	18.6±6.8	2.8±2.8	16.6±4.2	57.2±8.3	35.5±8.4
Cheboygan	28.6±7.7	5.5±4.1	16.8±4.0	64.2±8.0	32.0±7.3
Chippewa	18.5±5.4	3.4±2.8	23.4±4.4	56.1±7.2	21.0±5.8
Clare	24.9±6.9	1.0±1.3	23.1±4.2	82.8±8.6	29.9±6.2
Clinton	25.5±5.4	0.6±0.7	23.8±3.6	47.7±5.6	30.2±6.1
Crawford	28.2±10.4	1.0±2.0	23.0±6.7	69.7±12.0	32.7±10.2
Delta	34.6±7.1	2.9±2.3	19.3±3.5	62.6±6.8	27.6±6.0
Dickinson	23.4±6.9	2.3±2.3	19.7±4.3	47.0±6.9	24.7±6.1
Eaton	25.1±4.0	1.8±1.2	19.5±2.5	48.4±4.3	28.5±4.3
Emmet	21.4±6.3	2.4±2.4	17.7±4.2	55.6±7.6	18.4±6.4
Genesee	30.6±2.1	3.3±0.7	21.7±1.3	64.4±2.4	34.2±2.4
Gladwin	30.3±8.3	3.3±3.3	17.4±3.6	70.3±8.4	24.2±5.7
Gogebic	27.4±8.3	3.2±4.0	17.8±4.4	55.0±8.3	40.1±7.9
Grand Traverse	20.5±4.2	0.9±0.9	17.4±2.7	52.5±4.9	40.3±5.4
Gratiot	23.4±6.0	5.0±2.8	19.4±3.8	46.0±6.3	36.8±7.2
Hillsdale	28.1±6.1	2.1±1.8	23.5±3.7	57.7±6.3	26.5±5.4
Houghton	23.4±6.3	4.6±3.3	19.0±3.5	46.1±6.4	34.2±5.5
Huron	26.9±6.2	1.0±1.4	24.2±3.9	51.5±6.0	28.1±5.4
Ingham	27.0±2.7	2.3±0.8	18.0±1.6	50.1±2.9	30.6±3.1
Ionia	25.9±5.5	1.4±1.4	19.8±3.3	54.9±6.0	31.0±6.3
Iosco	27.5±7.4	3.7±3.4	20.1±4.0	68.0±7.7	32.8±6.5
Iron	28.9±10.5	0.6±1.3	17.2±4.8	62.4±10.0	18.6±5.4
Isabella	24.3±6.0	2.4±1.8	18.4±3.6	61.4±6.9	29.4±6.6
Jackson	30.0±3.4	3.9±1.3	21.8±2.0	64.3±3.8	35.4±3.7
Kalamazoo	25.4±2.7	2.4±0.9	19.7±1.7	54.5±3.0	31.6±3.0
Kalkaska	19.4±8.9	1.3±2.5	27.7±6.7	64.4±11.1	30.8±6.7

\*Rates are computed by gender for breast, cervical and prostate cancer.

## Appendix

### Mortality Rates by County

County	Age-Adjusted Rate per 100,000 Population*				
	Breast	Cervical	Colorectal	Lung	Prostate
Kent	26.9±1.9	1.8±0.5	18.8±1.1	47.5±1.9	31.9±2.0
Keweenaw	21.4±19.6	0.0±0.0	9.1±6.9	52.2±20.2	13.2±9.3
Lake	34.8±13.8	4.3±5.2	32.0±7.4	63.1±11.9	35.6±11.3
Lapeer	27.1±4.9	2.5±1.5	21.6±3.1	55.5±5.4	40.9±6.2
Leelanau	25.6±8.9	1.4±0.0	14.6±4.0	44.9±7.9	21.0±7.1
Lenawee	26.6±4.1	3.0±1.5	21.2±2.6	54.1±4.4	33.6±4.8
Livingston	26.3±3.7	2.1±1.1	20.5±2.5	54.3±4.2	36.3±4.5
Luce	13.0±11.6	2.2±4.4	24.7±10.0	64.7±17.4	41.3±12.2
Mackinac	44.9±14.6	2.8±4.0	20.7±6.5	71.2±12.6	29.2±11.2
Macomb	30.3±1.5	2.2±0.4	22.0±0.9	59.1±1.6	31.8±1.6
Manistee	24.9±7.4	3.7±3.1	27.3±5.1	58.8±7.9	35.9±8.1
Marquette	25.9±5.1	1.4±1.2	16.0±2.7	57.7±5.5	27.0±4.9
Mason	26.8±6.9	0.9±1.3	21.1±4.3	61.4±7.8	29.8±6.5
Mecosta	22.0±6.1	2.3±2.3	24.0±4.3	62.8±7.5	29.4±6.1
Menominee	20.1±6.4	0.8±1.5	16.9±4.0	46.8±7.3	27.4±7.3
Midland	27.0±4.6	2.5±1.3	19.0±2.8	54.7±5.0	22.1±4.3
Missaukee	16.8±7.9	4.5±5.1	19.5±5.5	56.6±11.0	23.2±7.6
Monroe	27.1±3.6	3.3±1.3	22.4±2.3	61.2±4.0	31.8±4.0
Montcalm	22.6±5.0	3.9±2.1	23.2±3.4	62.4±6.1	33.0±5.6
Montmorency	33.2±14.0	3.9±4.7	22.4±7.0	71.0±12.3	22.3±7.9
Muskegon	29.8±3.3	2.7±1.0	18.2±1.8	58.3±3.5	27.7±3.1
Newaygo	24.2±5.4	1.2±1.4	18.8±3.4	66.2±6.8	25.1±5.5
Oakland	27.6±1.2	2.0±0.3	18.6±0.7	52.1±1.3	31.2±1.4
Oceana	22.3±6.9	2.9±2.9	18.0±4.7	48.4±7.9	20.4±5.9
Ogemaw	27.4±7.7	4.1±3.7	21.3±4.9	66.5±8.9	26.1±6.1
Ontonagon	24.2±12.6	4.4±6.2	17.0±6.3	53.8±12.2	40.4±11.1
Osceola	21.9±7.7	2.8±3.2	17.0±4.6	67.5±9.7	33.6±9.2
Oscoda	34.0±12.6	0.0±0.0	17.0±7.2	66.5±13.3	30.1±11.0
Otsego	22.3±7.3	3.2±2.9	20.8±4.8	50.1±8.4	29.0±6.5
Ottawa	25.7±2.9	0.9±0.6	16.9±1.6	37.5±2.6	29.6±3.1
Presque Isle	29.0±10.5	1.5±2.0	17.9±4.8	57.1±9.9	25.5±7.3
Roscommon	23.0±7.2	1.7±2.6	19.9±4.0	69.8±7.9	26.1±5.2
Saginaw	26.3±2.7	3.4±1.1	21.3±1.7	61.4±3.2	35.9±3.3
St. Clair	27.5±3.3	3.0±1.1	23.9±2.2	63.6±3.7	33.4±3.4
St. Joseph	25.3±5.0	2.6±1.8	24.8±3.5	63.6±5.9	31.2±5.5
Sanilac	24.6±6.0	5.6±3.0	20.5±3.5	57.9±6.2	38.2±5.9
Schoolcraft	33.6±14.1	1.4±2.8	28.9±8.7	67.3±14.0	27.6±9.5
Shiawassee	25.4±4.8	3.7±2.0	21.7±3.2	56.8±5.4	26.1±5.1
Tuscola	28.6±5.5	1.7±1.5	24.9±3.7	51.3±5.5	35.3±5.6
Van Buren	23.3±4.5	1.8±1.3	22.4±3.1	53.6±5.0	33.6±5.0
Washtenaw	26.9±2.7	1.7±0.6	20.4±1.7	51.4±2.9	32.3±3.0
Wayne	32.7±1.0	3.3±0.3	23.3±0.6	63.7±1.1	38.3±1.1
Wexford	23.0±6.8	2.7±2.3	18.2±4.0	58.8±8.0	25.7±6.5
Michigan	28.3±0.4	2.5±0.1	20.9±0.3	57.7±0.5	32.9±0.5

\*Rates are computed by gender for breast, cervical and prostate cancer.

Table 2.

## Breast, Cervical, Colorectal, Lung and Prostate Cancer Incidence Rates by County, Michigan 1993-2002

County	Age-Adjusted Rate per 100,000 Population*				
	Breast	Cervical (in situ and invasive)	Colorectal	Lung	Prostate
Alcona	143.5±25.9	65.3±24.5	54.8±10.2	87.4±13.2	154.0±22.2
Alger	120.9±27.6	28.2±17.2	55.7±12.0	61.9±13.7	141.5±28.2
Allegan	121.5±9.3	39.9±5.5	56.1±4.4	63.0±4.9	135.7±10.5
Alpena	134.4±16.0	92.7±16.0	66.8±7.7	77.5±8.5	173.9±18.4
Antrim	134.0±19.5	71.6±17.2	50.4±8.1	74.6±9.7	221.2±23.0
Arenac	118.7±21.2	50.9±16.3	68.2±10.7	92.2±12.6	175.8±24.2
Baraga	108.4±29.0	41.3±21.9	47.7±12.4	78.7±16.2	130.5±29.9
Barry	104.5±11.5	33.8±7.0	41.0±5.0	52.6±5.9	153.6±14.2
Bay	119.2±8.4	56.7±6.3	52.6±3.8	81.1±4.9	199.2±11.2
Benzie	124.8±22.7	102.5±24.5	57.0±9.3	78.0±12.2	227.2±28.9
Berrien	146.9±7.6	49.3±4.8	61.4±3.4	82.5±4.1	200.9±9.3
Branch	100.3±12.5	30.4±7.3	45.6±5.7	71.7±7.5	138.0±14.6
Calhoun	125.2±7.7	48.0±5.1	56.1±3.5	77.3±4.3	145.5±8.7
Cass	105.7±11.6	38.9±7.8	46.9±5.4	70.0±6.8	132.9±13.5
Charlevoix	140.9±19.1	53.0±13.0	48.8±7.7	67.1±9.3	171.1±21.2
Cheboygan	129.7±17.5	49.2±13.0	48.7±7.2	72.3±8.8	209.7±21.5
Chippewa	118.9±15.5	26.5±8.0	60.1±7.4	70.2±8.2	136.9±16.5
Clare	117.3±15.5	45.3±11.4	60.5±7.3	104.0±9.9	198.7±18.9
Clinton	95.8±10.6	26.1±5.6	46.1±5.4	46.4±5.5	150.9±14.7
Crawford	112.9±22.7	55.9±18.9	45.7±9.8	75.1±12.6	161.0±25.8
Delta	143.4±15.1	38.9±8.9	58.3±6.4	73.0±7.5	176.0±16.8
Dickinson	113.5±16.1	44.8±11.7	50.5±7.2	62.1±8.1	142.3±17.7
Eaton	116.5±9.1	38.3±5.3	43.9±4.0	52.3±4.6	152.5±11.6
Emmet	149.9±18.2	57.2±12.5	50.6±7.3	74.8±9.1	165.7±20.6
Genesee	134.9±4.7	74.4±3.5	57.3±2.2	82.7±2.7	237.8±7.0
Gladwin	122.9±17.2	41.3±12.0	54.9±7.4	96.4±10.1	187.2±19.3
Gogebic	110.9±18.8	61.7±18.2	52.9±8.2	67.5±9.7	165.9±20.7
Grand Traverse	165.4±12.5	104.8±10.5	59.6±5.2	82.1±6.3	283.5±17.3
Gratiot	134.1±15.1	39.3±8.8	58.7±6.9	63.0±7.5	179.2±18.3
Hillsdale	110.9±12.9	24.0±6.5	53.5±6.0	64.8±6.9	128.9±13.7
Houghton	119.1±15.7	41.0±10.6	51.9±6.3	52.7±6.9	153.0±15.9
Huron	122.9±14.5	44.6±10.6	55.4±6.2	60.8±6.8	175.6±16.3
Ingham	151.2±6.7	39.3±3.2	61.2±3.1	72.2±3.5	195.9±8.5
Ionia	118.6±12.3	44.8±7.6	47.0±5.3	63.6±6.6	146.6±14.7
Iosco	127.7±16.5	37.8±11.6	55.7±7.1	88.5±9.2	186.4±18.3
Iron	108.8±21.5	29.3±15.1	55.7±9.5	81.5±11.9	113.9±19.7
Isabella	125.4±14.0	18.6±5.3	55.3±6.6	71.4±7.7	163.2±17.3
Jackson	118.4±7.2	45.0±4.8	55.4±3.4	80.0±4.3	133.0±8.0

\*Rates are computed by gender for breast, cervical and prostate cancer.

# Appendix Incidence Rates by County

County	Age-Adjusted Rate per 100,000 Population*				
	Breast	Cervical (in-situ and invasive)	Colorectal	Lung	Prostate
Kalamazoo	127.2±6.3	54.6±4.0	47.9±2.8	69.3±3.4	167.4±8.1
Kalkaska	114.3±21.7	74.4±19.9	53.0±10.1	71.8±12.4	172.4±26.9
Kent	135.4±4.4	43.1±2.4	49.5±1.9	58.6±2.1	179.1±5.5
Keweenaw	125.4±58.3	5.2±10.1	50.6±18.9	46.6±18.5	92.6±41.8
Lake	145.9±29.4	69.1±25.1	64.5±11.6	79.0±14.0	177.4±27.2
Lapeer	119.5±10.3	87.0±8.9	57.4±5.2	73.9±6.2	192.7±14.7
Leelanau	123.6±19.7	66.2±17.6	42.3±7.8	48.0±8.2	245.5±26.2
Lenawee	126.8±9.4	39.2±5.6	51.1±4.2	67.3±5.0	181.5±12.1
Livingston	126.5±8.4	41.5±4.7	52.8±4.1	61.2±4.5	151.7±10.4
Luce	161.7±40.2	73.3±34.5	67.2±16.3	82.6±20.1	171.8±39.8
Mackinac	127.1±25.6	46.1±19.7	62.5±11.8	86.1±14.2	176.1±28.9
Macomb	132.8±3.3	85.9±2.8	60.9±1.6	81.3±1.9	202.4±4.4
Manistee	123.1±17.6	47.6±13.5	55.3±7.7	73.2±9.1	187.5±20.6
Marquette	149.9±12.8	36.3±6.6	50.9±5.1	73.2±6.3	167.8±13.7
Mason	130.4±16.6	46.4±11.9	58.8±7.4	72.8±8.6	189.6±19.3
Mecosta	112.7±14.7	41.1±9.4	47.3±6.5	74.1±8.3	141.6±16.3
Menominee	110.1±16.8	29.6±10.0	42.9±6.8	56.7±8.2	160.3±18.6
Midland	131.1±10.7	21.5±4.4	54.6±5.0	66.1±5.6	188.3±14.2
Missaukee	130.4±24.7	60.2±18.8	51.1±10.4	67.9±12.3	142.6±24.7
Monroe	109.3±7.4	49.8±5.2	56.1±3.8	80.3±4.7	159.4±9.8
Montcalm	122.0±12.2	48.3±8.1	59.3±5.8	76.4±6.8	183.5±15.1
Montmorency	143.7±28.4	74.9±28.5	60.2±12.4	100.8±14.9	207.8±29.1
Muskegon	141.7±7.7	74.0±5.9	53.5±3.3	72.7±3.9	215.8±9.9
Newaygo	113.7±13.1	46.2±9.2	52.8±6.0	73.1±7.3	176.6±16.0
Oakland	148.9±2.9	82.0±2.3	57.6±1.3	73.2±1.5	235.5±4.1
Oceana	136.3±18.8	63.1±14.5	50.4±7.8	69.9±9.7	197.7±22.7
Ogemaw	118.0±18.1	28.9±10.7	50.4±7.7	77.6±9.8	167.7±19.8
Ontonagon	133.3±29.0	79.8±31.2	57.0±12.6	65.7±13.9	158.6±29.5
Osceola	134.1±19.9	54.3±14.1	68.8±9.9	87.6±11.3	203.1±24.0
Oscoda	119.8±26.2	37.0±19.6	50.7±11.6	74.1±14.0	131.5±25.5
Otsego	122.6±19.5	63.0±15.3	57.0±9.0	72.4±10.5	262.4±27.2
Ottawa	135.1±6.9	26.3±3.0	49.5±3.0	42.4±2.9	155.2±8.0
Presque Isle	119.8±21.2	60.0±19.3	52.7±8.9	69.1±11.1	179.8±24.3
Roscommon	133.1±17.1	43.5±13.6	56.4±7.0	99.5±9.8	205.8±18.4
Saginaw	128.1±6.4	61.3±4.7	54.7±2.9	78.3±3.6	236.0±9.3
St. Clair	138.6±7.7	84.7±6.4	66.3±3.7	86.4±4.4	171.7±9.1
St. Joseph	117.2±11.4	57.6±8.7	60.9±5.6	80.3±6.7	135.3±12.7
Sanilac	112.6±12.9	86.4±12.9	54.3±6.0	67.3±6.8	157.4±15.0
Schoolcraft	133.1±30.0	60.0±25.7	56.2±12.3	85.1±16.2	189.3±34.6
Shiawassee	142.0±11.7	53.8±7.6	58.3±5.4	75.0±6.2	209.2±15.3
Tuscola	122.4±12.1	51.2±8.4	64.5±6.1	62.0±6.2	194.1±15.6
Van Buren	125.9±10.7	52.1±7.4	48.4±4.7	65.5±5.6	158.1±12.5
Washtenaw	145.6±6.5	40.7±3.0	53.2±2.9	64.5±3.3	179.4±8.2
Wayne	127.5±2.0	84.6±1.7	62.2±1.0	88.3±1.2	234.5±3.0
Wexford	134.5±17.5	59.9±12.7	60.8±7.9	77.7±9.5	198.0±21.5
Michigan	131.9±1.0	65.4±0.7	56.9±0.4	75.8±0.5	200.3±1.3
*Rates are computed by gender for breast, cervical and prostate cancer.					

Table 3.

## Percentage of Breast Cancer Cases Localized at Diagnosis by County, 1990-1992 and 2000-2002

County	Localized at Diagnosis	
	1990-1992	2000-2002
Alcona	70.0%	71.4%
Alger	50.0%	52.4%
Allegan	55.4%	59.2%
Alpena	72.5%	72.6%
Antrim	55.6%	65.6%
Arenac	29.0%	51.3%
Baraga	36.8%	68.8%
Barry	39.5%	67.8%
Bay	19.4%	61.9%
Benzie	57.6%	65.6%
Berrien	55.8%	61.4%
Branch	31.6%	62.2%
Calhoun	58.5%	56.2%
Cass	43.7%	57.3%
Charlevoix	50.8%	61.3%
Cheboygan	62.0%	76.1%
Chippewa	54.5%	53.3%
Clare	56.8%	69.1%
Clinton	44.4%	58.6%
Crawford	28.6%	84.0%
Delta	61.6%	64.9%
Dickinson	44.3%	63.8%
Eaton	59.8%	65.4%
Emmet	64.3%	70.2%
Genesee	50.4%	59.9%
Gladwin	46.0%	75.7%
Gogebic	63.5%	62.5%
Grand Traverse	55.8%	63.3%
Gratiot	79.4%	63.4%
Hillsdale	54.9%	63.5%
Houghton	68.1%	69.4%
Huron	20.7%	55.6%
Ingham	61.9%	66.3%
Ionia	40.7%	53.6%
Iosco	32.9%	64.0%
Iron	45.0%	64.5%
Isabella	63.8%	52.5%
Jackson	64.8%	66.1%
Kalamazoo	60.4%	59.5%
Kalkaska	70.0%	71.4%

## Appendix

### Breast Cancer Cases Localized at Diagnosis by County

County	Localized at Diagnosis	
	1990-1992	2000-2002
Kent	64.5%	Data not available
Keweenaw	66.7%	55.6%
Lake	27.3%	57.9%
Lapeer	53.6%	60.0%
Leelanau	43.9%	53.3%
Lenawee	59.1%	63.3%
Livingston	49.5%	67.3%
Luce	41.7%	53.3%
Mackinac	78.6%	57.1%
Macomb	58.9%	60.3%
Manistee	61.5%	55.7%
Marquette	58.5%	63.1%
Mason	27.4%	62.5%
Mecosta	53.3%	54.9%
Menominee	51.1%	38.9%
Midland	60.8%	70.4%
Missaukee	36.4%	63.0%
Monroe	46.6%	59.2%
Montcalm	60.9%	57.8%
Montmorency	59.5%	63.8%
Muskegon	53.4%	57.7%
Newaygo	57.0%	50.0%
Oakland	60.7%	61.1%
Oceana	42.0%	61.9%
Ogemaw	26.8%	67.9%
Ontonagon	47.4%	56.0%
Osceola	45.2%	66.7%
Oscoda	34.8%	41.7%
Otsego	50.0%	67.4%
Ottawa	64.4%	53.6%
Presque Isle	60.0%	68.6%
Roscommon	44.0%	67.6%
Saginaw	43.2%	65.4%
St. Clair	56.7%	56.9%
St. Joseph	50.9%	58.6%
Sanilac	49.3%	54.5%
Schoolcraft	57.9%	75.0%
Shiawassee	35.1%	61.8%
Tuscola	31.1%	66.4%
Van Buren	57.3%	63.2%
Washtenaw	63.2%	69.2%
Wayne	54.7%	57.6%
Wexford	31.8%	64.2%
Michigan	55.4%	60.0%

Table 4.

## Percentage of Cervical Cancer Cases In-situ at Diagnosis by County, 1990-1992 and 2000-2002

County	In-situ at Diagnosis	
	1990-1992	2000-2002
Alcona	81.8%	66.7%
Alger	80.0%	100.0%
Allegan	84.7%	83.3%
Alpena	83.9%	83.8%
Antrim	72.7%	86.5%
Arenac	100.0%	76.9%
Baraga	57.1%	75.0%
Barry	87.9%	80.0%
Bay	60.6%	87.7%
Benzie	75.0%	93.9%
Berrien	60.6%	85.8%
Branch	71.9%	90.0%
Calhoun	70.9%	84.3%
Cass	72.4%	83.8%
Charlevoix	73.3%	80.0%
Cheboygan	87.5%	100.0%
Chippewa	76.2%	42.9%
Clare	83.3%	58.3%
Clinton	73.7%	69.2%
Crawford	72.7%	100.0%
Delta	63.0%	81.5%
Dickinson	58.8%	94.7%
Eaton	74.5%	87.1%
Emmet	75.0%	72.0%
Genesee	72.1%	85.5%
Gladwin	60.0%	60.0%
Gogebic	87.5%	37.5%
Grand Traverse	82.8%	93.1%
Gratiot	75.6%	68.4%
Hillsdale	79.3%	75.0%
Houghton	88.9%	76.9%
Huron	56.3%	88.0%
Ingham	82.7%	82.1%
Ionia	76.3%	84.8%
Iosco	68.8%	56.3%
Iron	60.0%	33.3%
Isabella	87.8%	45.0%
Jackson	65.5%	84.2%
Kalamazoo	87.2%	92.4%
Kalkaska	45.5%	78.6%

**Appendix**  
Cervical Cancer Cases In-situ at Diagnosis by County

County	In-situ at Diagnosis	
	1990-1992	2000-2002
Kent	84.9%	Data not available
Keweenaw	100.0%	No cases reported
Lake	50.0%	71.4%
Lapeer	83.9%	92.2%
Leelanau	80.0%	94.7%
Lenawee	78.3%	85.7%
Livingston	79.3%	89.7%
Luce	70.0%	83.3%
Mackinac	45.5%	66.7%
Macomb	87.5%	91.5%
Manistee	78.3%	82.4%
Marquette	83.0%	76.9%
Mason	65.2%	37.5%
Mecosta	81.0%	69.2%
Menominee	57.1%	60.0%
Midland	75.0%	82.6%
Missaukee	37.5%	55.6%
Monroe	84.0%	79.8%
Montcalm	79.6%	57.7%
Montmorency	87.5%	100.0%
Muskegon	75.9%	92.9%
Newaygo	77.8%	84.6%
Oakland	87.7%	90.0%
Oceana	65.0%	91.9%
Ogemaw	78.6%	50.0%
Ontonagon	83.3%	83.3%
Osceola	75.0%	71.4%
Oscoda	50.0%	40.0%
Otsego	75.0%	80.0%
Ottawa	84.5%	84.2%
Presque Isle	100.0%	55.6%
Roscommon	73.3%	66.7%
Saginaw	59.1%	87.5%
St. Clair	87.2%	90.7%
St. Joseph	80.3%	89.7%
Sanilac	64.9%	83.0%
Schoolcraft	66.7%	60.0%
Shiawassee	79.0%	81.3%
Tuscola	66.7%	84.9%
Van Buren	80.6%	86.0%
Washtenaw	67.5%	89.2%
Wayne	82.5%	87.1%
Wexford	76.9%	90.0%
Michigan	81.1%	87.2%

Table 5.

## Percentage of Colorectal Cancer Cases Localized at Diagnosis by County, 1990-1992 and 2000-2002

County	Localized at Diagnosis	
	1990-1992	2000-2002
Alcona	46.8%	43.2%
Alger	25.0%	36.8%
Allegan	24.1%	33.5%
Alpena	37.7%	51.5%
Antrim	37.8%	34.9%
Arenac	34.1%	40.8%
Baraga	19.2%	33.3%
Barry	11.3%	48.6%
Bay	12.0%	37.8%
Benzie	22.2%	22.6%
Berrien	26.6%	33.7%
Branch	26.9%	32.7%
Calhoun	25.6%	38.7%
Cass	17.1%	18.3%
Charlevoix	20.8%	53.1%
Cheboygan	51.0%	47.4%
Chippewa	27.3%	35.9%
Clare	46.6%	39.1%
Clinton	34.7%	39.3%
Crawford	29.6%	26.1%
Delta	56.2%	45.3%
Dickinson	25.4%	44.1%
Eaton	30.0%	47.1%
Emmet	38.3%	46.6%
Genesee	29.6%	41.8%
Gladwin	25.0%	36.4%
Gogebic	25.5%	30.8%
Grand Traverse	36.8%	40.6%
Gratiot	50.0%	34.6%
Hillsdale	29.8%	34.1%
Houghton	32.4%	28.8%
Huron	8.9%	26.7%
Ingham	42.7%	51.7%
Ionia	24.7%	40.0%
Iosco	50.0%	31.3%
Iron	22.9%	36.7%
Isabella	66.7%	33.8%
Jackson	48.6%	44.8%
Kalamazoo	29.8%	31.2%
Kalkaska	41.7%	39.1%

**Appendix**  
Colorectal Cancer Cases Localized at Diagnosis by County

County	Localized at Diagnosis	
	1990-1992	2000-2002
Kent	26.5%	Data not available
Keweenaw	14.3%	25.0%
Lake	21.9%	30.6%
Lapeer	34.2%	39.2%
Leelanau	27.6%	41.9%
Lenawee	30.2%	38.4%
Livingston	36.5%	44.0%
Luce	33.3%	28.0%
Mackinac	38.5%	35.7%
Macomb	34.9%	38.5%
Manistee	67.6%	36.0%
Marquette	33.1%	37.8%
Mason	10.8%	35.5%
Mecosta	27.1%	26.2%
Menominee	51.1%	37.5%
Midland	30.4%	33.1%
Missaukee	16.7%	28.0%
Monroe	27.0%	26.5%
Montcalm	36.8%	34.1%
Montmorency	35.0%	45.2%
Muskegon	28.8%	44.2%
Newaygo	32.6%	44.4%
Oakland	36.0%	42.3%
Oceana	28.6%	53.1%
Ogemaw	32.6%	25.0%
Ontonagon	38.1%	28.6%
Osceola	13.6%	30.2%
Oscoda	38.1%	35.3%
Otsego	32.4%	40.9%
Ottawa	35.8%	40.3%
Presque Isle	31.0%	53.6%
Roscommon	30.6%	43.1%
Saginaw	36.8%	33.2%
St. Clair	37.3%	41.2%
St. Joseph	30.9%	46.0%
Sanilac	33.0%	41.5%
Schoolcraft	38.1%	33.3%
Shiawassee	14.7%	35.0%
Tuscola	26.5%	32.2%
Van Buren	26.9%	30.2%
Washtenaw	38.3%	39.8%
Wayne	30.9%	38.5%
Wexford	10.5%	34.0%
Michigan	32.3%	38.3%

Table 6.

## Breast, Cervical and Colorectal Cancer Age-adjusted Rates of Late Stage Cases at Diagnosis by County, 1987-1994 and 1995-2002

County	Breast 1987-1994 (n)	Breast 1995-2002 (n)	Cervical 1987-1994 (n)	Cervical 1995-2002 (n)	Colorectal 1987-1994 (n)	Colorectal 1995-2002 (n)
Alcona	27.5 (16)	36.0 (28)	2.9 (1)	2.0 (1)	29.3 (41)	28.5 (45)
Alger	59.6 (24)	40.3 (19)	4.7 (2)	--- (---)	35.9 (30)	33.1 (33)
Allegan	28.6 (102)	34.2 (142)	0.9 (3)	2.0 (8)	20.8 (136)	32.3 (248)
Alpena	34.9 (49)	38.7 (61)	2.5 (3)	1.3 (2)	29.4 (79)	36.9 (113)
Antrim	41.0 (37)	51.0 (56)	0.8 (1)	1.3 (1)	21.3 (37)	26.5 (59)
Arenac	36.4 (28)	32.6 (27)	4.4 (3)	5.4 (4)	27.9 (39)	29.0 (48)
Baraga	32.5 (11)	35.9 (16)	5.7 (2)	4.0 (1)	27.5 (24)	20.6 (17)
Barry	16.8 (33)	27.5 (64)	1.0 (2)	1.7 (4)	15.5 (58)	18.7 (82)
Bay	48.5 (234)	43.7 (220)	3.7 (17)	2.9 (14)	36.3 (324)	28.2 (276)
Benzie	28.4 (18)	33.7 (28)	7.2 (4)	1.4 (1)	30.6 (38)	26.6 (44)
Berrien	40.8 (283)	45.4 (332)	4.5 (30)	3.2 (22)	31.1 (410)	34.4 (489)
Branch	56.3 (97)	31.8 (61)	4.2 (7)	3.9 (7)	35.3 (113)	22.0 (83)
Calhoun	38.0 (224)	37.7 (240)	3.2 (18)	3.5 (21)	32.2 (352)	31.3 (373)
Cass	27.4 (57)	29.4 (67)	3.5 (8)	2.9 (6)	15.5 (62)	21.4 (92)
Charlevoix	23.4 (23)	40.8 (46)	6.8 (6)	3.9 (5)	33.4 (60)	19.6 (46)
Cheboygan	28.1 (30)	31.0 (40)	2.7 (2)	1.8 (2)	24.8 (52)	22.6 (61)
Chippewa	40.2 (50)	46.4 (69)	3.7 (4)	3.0 (4)	36.9 (97)	30.5 (93)
Clare	26.8 (37)	26.2 (40)	4.0 (5)	2.9 (3)	23.5 (61)	22.1 (68)
Clinton	22.6 (47)	26.8 (69)	--- (---)	2.4 (6)	19.8 (74)	22.9 (103)
Note: Rates are age-adjusted per 100,000 population and are computed by gender for breast and cervical cancer; Late stage is the combination of distant and regional cases out of all invasive cases						

**Appendix**

**Breast, Cervical and Colorectal Cancer Age-adjusted Rates of Late Stage Cases by County**

County	Breast 1987-1994 (n)	Breast 1995-2002 (n)	Cervical 1987-1994 (n)	Cervical 1995-2002 (n)	Colorectal 1987-1994 (n)	Colorectal 1995-2002 (n)
Crawford	22.7 (13)	24.5 (17)	2.7 (1)	--- (---)	12.3 (14)	17.3 (24)
Delta	27.9 (49)	25.8 (50)	2.6 (4)	3.2 (5)	19.5 (66)	20.3 (78)
Dickinson	26.3 (29)	16.3 (25)	3.0 (4)	2.4 (3)	12.4 (34)	17.9 (51)
Eaton	32.9 (117)	29.8 (126)	1.4 (5)	1.4 (6)	23.5 (144)	17.8 (131)
Emmet	45.5 (50)	35.7 (49)	4.3 (4)	0.6 (1)	36.7 (79)	24.7 (66)
Genesee	52.2 (873)	40.8 (751)	5.3 (88)	3.6 (66)	34.9 (999)	31.3 (986)
Gladwin	33.5 (37)	34.8 (44)	7.2 (7)	3.6 (4)	32.0 (73)	31.1 (84)
Gogebic	34.9 (42)	41.4 (45)	6.0 (6)	2.7 (2)	28.0 (65)	30.5 (71)
Grand Traverse	51.5 (135)	55.3 (178)	1.8 (5)	1.3 (5)	27.2 (131)	32.8 (201)
Gratiot	30.9 (50)	41.1 (72)	1.8 (3)	3.5 (6)	25.3 (81)	28.3 (99)
Hillsdale	33.3 (62)	34.6 (73)	4.0 (7)	2.3 (4)	25.1 (90)	26.8 (106)
Houghton	32.6 (54)	25.6 (43)	2.8 (4)	4.1 (5)	21.4 (78)	25.1 (88)
Huron	51.0 (89)	34.4 (62)	5.7 (10)	3.2 (4)	28.1 (101)	27.2 (109)
Ingham	47.4 (434)	42.4 (426)	2.4 (24)	1.9 (20)	31.4 (489)	25.0 (434)
Ionia	33.8 (67)	36.8 (90)	3.2 (6)	1.3 (3)	26.1 (99)	18.0 (80)
Iosco	44.7 (66)	36.7 (54)	0.7 (1)	5.5 (6)	25.4 (66)	26.5 (84)
Iron	49.9 (41)	34.5 (29)	7.6 (3)	2.1 (1)	34.3 (65)	28.4 (49)
Isabella	28.4 (45)	34.4 (69)	1.9 (3)	2.6 (5)	17.1 (52)	19.4 (68)
Jackson	30.1 (183)	20.2 (136)	2.8 (15)	2.3 (15)	18.8 (216)	17.8 (228)
Kalamazoo	38.4 (326)	39.9 (373)	2.8 (24)	2.1 (19)	32.5 (480)	29.4 (496)
Note: Rates are age-adjusted per 100,000 population and are computed by gender for breast and cervical cancer; Late stage is the combination of distant and regional cases out of all invasive cases						

**Appendix**

**Breast, Cervical and Colorectal Cancer Age-adjusted Rates of Late Stage Cases by County**

County	Breast 1987-1994 (n)	Breast 1995-2002 (n)	Cervical 1987-1994 (n)	Cervical 1995-2002 (n)	Colorectal 1987-1994 (n)	Colorectal 1995-2002 (n)
Kalkaska	20.7 (12)	33.0 (22)	1.5 (1)	1.6 (1)	18.6 (20)	31.5 (42)
Kent	41.8 (779)	40.3 (866)	2.4 (42)	1.4 (30)	34.5 (1161)	27.2 (1059)
Keweenaw	14.0 (3)	41.0 (7)	--- (---)	--- (---)	41.4 (10)	22.5 (7)
Lake	26.8 (13)	38.9 (22)	5.1 (2)	1.3 (1)	27.2 (27)	30.7 (41)
Lapeer	32.2 (83)	37.7 (125)	1.6 (4)	2.6 (9)	26.5 (114)	26.6 (145)
Leelanau	31.4 (22)	47.7 (46)	--- (---)	1.2 (1)	16.5 (25)	19.7 (39)
Lenawee	36.8 (140)	41.9 (178)	4.8 (17)	1.2 (5)	26.0 (173)	24.7 (193)
Livingston	41.4 (171)	28.4 (162)	1.5 (6)	2.0 (11)	21.8 (139)	23.1 (206)
Luce	57.4 (16)	34.9 (10)	8.4 (2)	--- (---)	26.9 (14)	30.9 (20)
Mackinac	23.5 (14)	39.5 (23)	11.2 (6)	4.1 (2)	43.7 (48)	33.2 (41)
Macomb	42.1 (1328)	31.4 (1152)	3.3 (105)	2.3 (79)	37.6 (2032)	29.1 (1886)
Manistee	20.2 (22)	50.6 (61)	3.4 (4)	2.5 (3)	22.9 (49)	25.5 (67)
Marquette	43.3 (114)	46.3 (129)	2.4 (7)	2.7 (7)	28.4 (138)	26.1 (137)
Mason	35.9 (49)	23.8 (33)	10.7 (12)	1.4 (3)	19.7 (49)	29.5 (86)
Mecosta	21.2 (28)	26.2 (42)	3.0 (4)	1.9 (3)	23.3 (59)	19.0 (58)
Menominee	34.1 (44)	36.2 (44)	5.1 (5)	2.9 (3)	18.6 (46)	15.3 (39)
Midland	42.3 (123)	31.1 (107)	3.4 (10)	1.2 (4)	31.7 (156)	32.6 (195)
Missaukee	32.9 (15)	27.3 (17)	4.8 (3)	6.7 (4)	4.7 (5)	19.9 (25)
Monroe	21.9 (116)	33.1 (198)	1.8 (9)	4.1 (24)	22.8 (199)	35.2 (366)
Montcalm	33.1 (68)	36.2 (91)	4.6 (9)	2.6 (6)	31.6 (127)	24.4 (118)
Note: Rates are age-adjusted per 100,000 population and are computed by gender for breast and cervical cancer; Late stage is the combination of distant and regional cases out of all invasive cases						

**Appendix**

**Breast, Cervical and Colorectal Cancer Age-adjusted Rates of Late Stage Cases by County**

County	Breast 1987-1994 (n)	Breast 1995-2002 (n)	Cervical 1987-1994 (n)	Cervical 1995-2002 (n)	Colorectal 1987-1994 (n)	Colorectal 1995-2002 (n)
Montmorency	49.7 (23)	33.7 (19)	2.2 (1)	2.6 (1)	35.7 (41)	31.4 (40)
Muskegon	34.9 (222)	44.3 (319)	2.7 (18)	2.3 (16)	21.6 (271)	27.4 (377)
Newaygo	31.4 (51)	27.7 (55)	0.8 (1)	2.6 (5)	25.7 (82)	21.1 (83)
Oakland	41.0 (1836)	31.6 (1621)	2.9 (131)	2.4 (125)	33.6 (2529)	25.6 (2239)
Oceana	39.0 (37)	31.1 (35)	4.6 (4)	3.9 (4)	26.0 (47)	21.6 (48)
Ogemaw	35.8 (38)	32.3 (40)	--- (---)	3.5 (4)	27.9 (52)	33.1 (76)
Ontonagon	36.7 (16)	39.4 (19)	5.9 (2)	3.3 (2)	21.6 (22)	32.2 (30)
Osceola	23.9 (21)	25.6 (27)	---- (---)	2.9 (3)	15.2 (27)	31.3 (62)
Oscoda	29.6 (12)	39.9 (19)	7.0 (3)	7.1 (3)	21.0 (20)	24.6 (26)
Otsego	59.5 (47)	30.7 (30)	3.8 (3)	2.0 (2)	33.6 (49)	27.4 (53)
Ottawa	35.4 (238)	38.9 (331)	1.4 (10)	0.6 (5)	27.5 (324)	22.0 (336)
Presque Isle	23.0 (17)	35.5 (27)	4.2 (3)	0.9 (1)	28.0 (43)	25.0 (46)
Roscommon	25.5 (31)	35.9 (54)	0.7 (1)	0.5 (1)	20.2 (51)	19.6 (64)
Saginaw	30.6 (268)	33.5 (315)	3.2 (28)	2.8 (25)	17.0 (271)	23.9 (408)
St. Clair	49.4 (297)	35.4 (248)	5.7 (34)	1.9 (13)	38.1 (427)	32.8 (421)
St. Joseph	35.8 (88)	39.3 (106)	3.8 (9)	3.1 (8)	27.2 (127)	31.9 (163)
Sanilac	32.5 (61)	30.1 (62)	8.6 (14)	3.9 (8)	28.1 (105)	26.9 (111)
Schoolcraft	57.2 (26)	26.4 (12)	6.8 (2)	--- (---)	23.9 (22)	31.7 (32)
Shiawassee	29.3 (80)	40.4 (125)	2.8 (8)	2.3 (7)	20.9 (104)	31.7 (174)
Tuscola	43.3 (98)	33.2 (85)	1.8 (4)	2.1 (5)	22.5 (92)	34.8 (163)
Note: Rates are age-adjusted per 100,000 population and are computed by gender for breast and cervical cancer; Late stage is the combination of distant and regional cases out of all invasive cases						

**Appendix**

**Breast, Cervical and Colorectal Cancer Age-adjusted Rates of Late Stage Cases by County**

County	Breast 1987-1994 (n)	Breast 1995-2002 (n)	Cervical 1987-1994 (n)	Cervical 1995-2002 (n)	Colorectal 1987-1994 (n)	Colorectal 1995-2002 (n)
Van Buren	32.4 (95)	30.9 (100)	4.0 (11)	1.6 (5)	26.6 (147)	27.3 (168)
Washtenaw	49.4 (731)	32.9 (355)	3.5 (31)	1.7 (19)	33.0 (466)	26.3 (455)
Wayne	46.4 (4155)	34.7 (3173)	5.6 (491)	3.9 (344)	38.4 (6136)	29.9 (4837)
Wexford	32.4 (36)	30.1 (44)	2.9 (3)	2.6 (4)	12.3 (28)	23.9 (63)
Note: Rates are age-adjusted per 100,000 population and are computed by gender for breast and cervical cancer; Late stage is the combination of distant and regional cases out of all invasive cases						